

The University of Chicago

THE GEOGRAPHY OF
CERTAIN PHASES OF GRADUATE
INSTRUCTION IN THE
UNITED STATES

A PART OF A DISSERTATION SUBMITTED TO
THE FACULTY OF THE DIVISION OF THE
SOCIAL SCIENCES IN CANDIDACY FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATION
1944

By
HOWARD EVERETT TEMPERO

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PREFATORY NOTE

This essential portion of the dissertation contains all of the original material except for Appendixes II to XXIV inclusive, and the Bibliography. The complete thesis is to be found only in the University of Chicago Library.

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CHAPTER I

INTRODUCTION

In 1935-36, 79,571 students received graduate instruction in the United States. In that same year 18,243 Masters' or comparable advanced engineering degrees and 2,768 doctorates were granted.¹ These figures give evidence that graduate instruction reaches a large portion of the American people. It has long been recognized, however, that since the growth of higher education has been opportunistic and without collective or co-operative planning²⁻⁷ the distribution of the facilities for higher education throughout the United States is not equitable. In fact, the problem of equal opportunity for graduate education is but one part of the larger problem of equal educational opportunity at all levels of education. Certainly uneven distribution of educational opportunity at the undergraduate level is an important factor af-

¹"Statistics in Higher Education, 1935-36." The Biennial Survey of Education in the United States: 1934-36, p. 48. United States Office of Education, Bulletin 1937, No. 2. Washington: Government Printing Office, 1938.

²Cooperation and Coordination in Higher Education, pp. 1-3. American Council on Education Studies, Series I, Vol. II, No. 5. Washington: American Council on Education, April, 1938.

³David S. Sanford, Inter-Institutional Agreements in Higher Education, pp. 2-3. New York: Bureau of Publications, Teachers College, Columbia University, 1934.

⁴W. C. Eells, Surveys of American Higher Education, pp. 31-32, 59, 242, and 351. New York: Carnegie Foundation for the Advancement of Teaching, 1937.

⁵American Association of University Professors, Committee Y, Depression, Recovery and Higher Education, pp. 484-86. New York: McGraw-Hill Publishing Company, 1937.

⁶Benjamin B. Kendrick, "A Southern Confederation of Learning," in "Higher Education and the New Regionalism in the South," Southwest Review, XIX (January, 1934), 190-91.

⁷Laurence Foster, The Functions of a Graduate School in a Democratic Society, p. 19. New York: Huxley Publishers, 1936.

fecting the uneven distribution of opportunity at the graduate level.

No study has been made of the geographical distribution of facilities for instruction at the graduate level, and only a few studies have considered the problem at the undergraduate level; these studies have usually dealt only with single institutions or small groups of colleges.¹⁻⁵ In such studies Foster and Dwyer have gone beyond the usual technique and have developed and applied an index comparing the distribution of students to that of the entire population; they used the state as the geographical unit, and their sections or regions were based on the United States census divisions.^{6,7}

Although it is recognized that graduate students freely cross state boundaries to attend the institutions of their choice, no study has been made to show the extent to which this practice serves to equalize the opportunity for higher education at the graduate level.

¹Melvin Haggerty, "College of Education," Biennial Report of the President of the University of Minnesota to the Board of Regents 1932-34, pp. 252-54. Bulletin of the University of Minnesota, Vol. XXXVII, No. 50. Minneapolis: University of Minnesota, November 27, 1934.

²John Q. Stewart, "An Inverse Distance Variation for Certain Social Influences: 1 - Geographical Distribution of College Undergraduates," Science, XCIII (January 24, 1941), 89-90.

³Floyd W. Reeves and John Dale Russell, College Organization and Administration: A Report Based upon a Series of Surveys of Church Colleges, pp. 47-52. Indianapolis, Indiana: Board of Education, Disciples of Christ, 1929.

⁴Floyd W. Reeves, John Dale Russell, H. C. Gregg, A. J. Brumbaugh, and L. E. Blauch, The Liberal Arts College: Based upon Surveys of Thirty-five Colleges Related to the Methodist Episcopal Church, pp. 22-37. Chicago, Illinois: University of Chicago Press, 1932.

⁵Charles H. Judd, A. H. Keith, Frank L. McVey, George A. Works, and Floyd W. Reeves, Report of a Survey of the State Institutions of Higher Learning in Indiana, pp. 54-67. Indianapolis, Indiana: Wm. B. Burford, Contractor for State Printing and Binding, 1926.

⁶C. R. Foster, Jr., and Paul S. Dwyer, "An Index of Distribution," The Journal of Higher Education, III (January, 1932), 17-20.

⁷Foster and Dwyer, A Study of the Geographic Distribution of Students in 363 American Colleges and Universities, p. 20. Rutgers University Studies in Education, No. 1. New Brunswick, New Jersey: Rutgers University, July, 1931.

Purposes of the Study

The primary purpose of this study was to discover the extent to which the recognized graduate schools served the population of the continental United States. The attack on this problem was made through the analysis of two types of data: (1) the distance which graduate students travel for instruction in departments offering the doctorate and (2) the county distribution of the homes of graduate students (limited wherever possible to those who were working in departments in which the doctorate was offered) in relation to such factors as the location of graduate institutions, the population of the county from twenty to twenty-nine years of age,¹ and the socio-economic index of the county.²

A secondary purpose of the study was to develop techniques to be used in the consideration of the foregoing problems--techniques which could also be applied to similar problems at other levels of education, especially to the problem of the distance which students can be expected to travel for instruction on the various levels of education.

Methods and Procedures

Selection of institutions.--In order to limit the scope of the study, only those institutions which granted degrees on the doctorate level were included; and, as far as possible, only the departments in which the institutions granted doctorates were considered. Several sources were used in completing the final list of institutions granting one or more doctorates. The first source was the list of institutions in the "Report of the Committee on Graduate Instruction."³ Additional institutions at which doctorates were granted were given in the biennial issues of the American

¹The ten-year period of twenty to twenty-nine, inclusive, was selected as the age range of the majority of students included in this study; thus, the term "population" will be used hereafter to indicate population aged twenty to twenty-nine. It should also be noted that these figures were taken from the United States census reports.

²University of Pennsylvania, Wharton School of Finance and Commerce, Migration and Economic Opportunity: The Report of the Study of Population Redistribution, pp. 17-27. Philadelphia: University of Pennsylvania Press, 1936.

³R. M. Hughes, Chairman, "Report of the Committee on Graduate Instruction," Educational Record, XV (April, 1934), 195-226.

Association of Collegiate Registrars' Report of the Committee on Special Projects for the years 1933 to 1935^{1,2} and their Seventh Annual Report on Enrolments in and Degrees Conferred by Member Institutions for the years 1934 to 1936,³ in the statistics in chapter iv of the Biennial Survey of Education in the United States: 1932-34,⁴ and in American Universities and Colleges.⁵ The catalogues and other official publications of each institution in the completed list were checked to ascertain all official statements concerning the doctorates offered. Appendix I contains not only the final list of included institutions⁶ but also the institutional code numbers.

Selection of degrees.--The great variety of earned doctorates which are offered by the educational institutions of the United States made it necessary to select certain doctorates from the complete list. The list of selected doctorates,⁷ the number of institutions which offered each degree, and the code numbers of the institutions which granted the various degrees are given in

¹"Total Enrolments and Degrees Conferred 1933-34 and 1932-33," Report of the Committee on Special Projects, pp. 1-7. Bulletin of the American Association of Collegiate Registrars. Menasha, Wisconsin: American Association of Collegiate Registrars, December, 1934.

²"Total Enrolments and Degrees Conferred 1934-35 and 1933-34," Report of the Committee on Special Projects, pp. 1-7. Bulletin of the American Association of Collegiate Registrars. Menasha, Wisconsin: American Association of Collegiate Registrars, December, 1935.

³"Total Enrolments and Degrees Conferred 1935-36 and 1934-35," Seventh Annual Report on Enrolments in and Degrees Conferred by Member Institutions, pp. 1-9. Compiled by Committee on Special Projects. Bulletin of the American Association of Collegiate Registrars. Menasha, Wisconsin: American Association of Collegiate Registrars, January, 1937.

⁴"Statistics of Higher Education, 1933-34," The Biennial Survey of Education in the United States: 1932-34, pp. 120-59. United States Office of Education, Bulletin 1935, No. 2. Washington: Government Printing Office, 1935.

⁵C. S. Marsh (ed.), American Universities and Colleges, Table XIII and pp. 173-1,027. Washington: American Council on Education. 3d ed., 1936.

⁶Appendix II contains a discussion of a number of institutions which were not included in the study, although they were border-line cases.

⁷A list of the doctorates in the fields of religion, law, and medicine which were not included are given in Appendix III.

Table 1.

Ascertainment of fields.--It was necessary to determine the fields or departments in which major work for one or more of the selected doctorates was offered by the institutions included in this study. If definite statements were given in the catalogues as to the departments in which one or more of the selected doctorates were offered, these sources were used; but wherever such information was not available, it was necessary to compile from the catalogues lists of the fields in which graduate work was offered at each institution and to send not only these compiled lists but also information on the doctorates granted to the administrator or administrators in charge of the graduate instruction at the various institutions asking them to indicate the fields in which any of the selected doctorates were offered.

In returning the lists, two administrators pointed out that doctorates at each of their institutions--for example, Columbia University--may be granted for work in a combination of departments; for some institutions, therefore, the list of departments may not cover all doctorates. This would be especially true of large institutions or of smaller institutions which specialize in certain broad areas of human knowledge.

After lists of fields had been obtained from each graduate school, an attempt was made to compile one common list of fields; but differences from institution to institution in the names of the departments, as well as variations in the courses offered, made it difficult to get a combined list of fields. This difficulty has also been experienced by previous workers; for example, Foster states:

The nomenclature and scope of departments vary considerably, so that it is often impossible, from catalog descriptions, to be positive about the exact correspondence between departments.¹

The explanations which follow Table 60 in Appendix IV give the titles of the fields or departments as indicated in official publications or in correspondence by the officers of the various institutions. In the final list the fields were grouped into five broad areas of knowledge and study,² namely: applied sciences and

¹Laurence Foster, op. cit., p. 20.

²The list giving the classification of the fields according to the five broad areas of learning is given in Appendix V.

TABLE 1

INSTITUTIONS GRANTING THE VARIOUS DOCTORATES
INCLUDED IN THE STUDY

Degree	Number of Institu- tions	Code Numbers of Institutions
Doctor of Philosophy.....	85 ^{a,b,c}	1-5, 7-8, 10-52, 52a, 54-88
Doctor of Education.....	25 ^b	2, 11, 20, 22, 23, 25, 34, 39, 46, 49, 50, 52, 53, 56, 57, 59, 68, 71, 73, 74, 76, 78, 80, 85, 86
Doctor of Science.....	10 ^c	6, 7, 9, 22, 25, 31, 53, 66, 75, 86
Doctor of Public Health.....	6	22, 25, 31, 57, 66, 88
Doctor of Engineering.....	4 ^d	7, 25, 45, 88
Doctor of Commercial Science....	2	22, 34
Doctor of Architecture.....	1	7
Doctor of Chemical Engineering..	1 ^e	43
Doctor of Civil Engineering.....	1	43
Doctor of Electrical Engineering	1 ^e	43
Doctor of Mechanical Engineering	1	43
Doctor of Religious Education...	1 ^f	2
Doctor of Social Science.....	1 ^f	2

^aIn this table Institution No. 52a is considered to be a college of Institution No. 52. The only doctorate granted at 52a is the Ph.D.

^bBeginning in the summer of 1938 Colorado State College of Education replaced the degree of Doctor of Philosophy with that of Doctor of Education. The data used for this institution were for a period previous to the summer of 1938.

^cIn some instances the Doctor of Philosophy and Doctor of Science degrees have special subscripts to indicate the field of major work for the degree.

^dThis number (four) includes Rice Institute. According to the catalogue, Rice Institute grants the degrees of Doctor of Philosophy and Doctor of Engineering; the list of fields checked by the Dean indicates that doctorates are offered in applied mathematics, biology, chemistry, mathematics, and physics.

^eThe catalogue of Polytechnic Institute of Brooklyn for 1937-38 indicates that the degrees of Doctor of Chemical Engineering and Doctor of Electrical Engineering have been added to their offering since 1935-36--the academic year for which the data were collected for this institution.

^fThe degrees of Doctor of Religious Education and Doctor of Social Science are granted by the faculty of the School of Religious and Social Work of Boston University. Appendix II contains additional comment on the Doctor of Religious Education degree.

professional schools, biological sciences, humanities, physical sciences, and social sciences. In several cases--such as geography and history--fields were considered as lying in two of these broader areas rather than in one, and the credit for such fields was divided between the two areas.

Compilation of lists of graduate students.--In order to study the distribution of the homes of students, lists of graduate students were obtained from the institutions which were included in the study. It was impractical to limit the students to those who were actually working on the doctorate level, for there is not at all times a definite line of demarcation between work on the Master's level and that on the Doctor's level; furthermore, the lists of graduate students as given by most institutions did not indicate which students were working for a Master's degree, a professional degree, or a doctorate. In so far as possible, however, the students who were included were those taking work in the departments which granted one or more of the selected doctorates. In a very few instances students of a department were included if they could continue for a doctorate in the same field or area of knowledge but in a different department of the same institution after they completed the work for the highest degree granted in the department in which they were working at that time.

For sixty-five, or approximately 74 per cent, of the institutions the lists of graduate students were taken from official publications--although in some cases directories or other publications were used, these official publications were generally catalogues--and for nine of these sixty-five institutions supplementary information was obtained from the registrars' or the deans' offices. For two institutions, the State College of Washington and Washington University of St. Louis, unofficial student directories served as the sources. For seventeen institutions--eighteen if The New York College of Forestry is not considered a part of Syracuse University--the lists were obtained from records, lists, or mimeographed material provided by the registrars' or deans' offices; except for the Colorado College of Education, Johns Hopkins University, and Northwestern University, these eighteen lists were prepared especially for this study. In four cases, namely, Duquesne University, Fordham University, Marquette University, and Niagara University, no satisfactory lists of graduate students were obtained. A summary of this information can be found in

Table 2.

TABLE 2

TYPES OF SOURCES OF THE LISTS OF STUDENTS

Type of Source	Number of Institutions ^a	Number of Students
Official publication ^b	65	33,529
Unofficial publication...	2	336
Unpublished list based on records in the registrar's or dean's office	18 ^c	10,461
No satisfactory list obtained.....	4	.....
Total.....	89 ^c	44,326

^aLists of the code numbers of the individual institutions grouped according to types of sources may be found in Appendix VI.

^bSupplementary information was obtained from institutions having the following code numbers: 2, 20, 26, 46, 50, 53, 68, 76, and 78.

^cThe list of students was obtained from the Dean of the Graduate School for No. 52 whereas the list of students for No. 52a was obtained from the Registrar of No. 52a; therefore, No. 52a is not here treated as a college of No. 52.

Forms used in recording information.--A card was prepared for each student included in the study, and on this card were recorded all pertinent facts which were available, for example, name, address, and major field. The information for all the students from a given county was then summarized on a single card for that county,¹ and a similar summarization was made for all students working in a given field or subject.

Measurement of distances.--Inasmuch as the students were classified according to the counties in which their home addresses were located, it was necessary to find some method of measuring the distances from the institutions to the various counties in order to study the effect of distance upon attendance at a graduate institution.

¹See Appendix VII for certain areas which have been treated as counties in this study.

To study the effect of distance upon attendance at these institutions, circles of given radii, using the locations of the various graduate institutions as the centers, were drawn. The counties in which one or more institutions were located formed one category, which was labelled "home county"; the second category contained the counties other than the home county which were located within a 25-mile radius of each institution; the remaining six zones included counties located within radii of 26 and 50 miles, 51 and 100 miles, 101 and 250 miles, 251 and 500 miles, 501 and 1,000 miles, and those with radii of more than 1,000 miles. Thus the distance each student traveled was measured in circular bands which increased in size as the distance from the institution became greater.

The locations of the institutions were determined as accurately as possible on a map (24.2 inches x 38.6 inches) of the United States, and each county was recorded as being in the zone in which the major portion of its area was located. In those cases in which the area of the county was evenly divided between two zones, the county was recorded as being in the zone nearer the institution. On each of the county cards, which were used to record the number of students from the county attending the various institutions, spaces were provided to record the distance of the county from each of the eighty-eight graduate institutions included in the study.

Selection of fifty-five institutions for study of national patterns.--If those selected institutions which offered work on the doctorate level in only a few fields or to a few students only had been included in all phases of the study, they might have influenced certain national patterns out of proportion to their true importance. It was deemed expedient, therefore, to select from these eighty-eight institutions a special group from which to secure representative national patterns and to collate therewith the patterns made by the entire group of eighty-eight institutions.

The patterns made by the thirty-one member institutions of the Association of American Universities located in the United States might have been used for comparison; but, although these institutions are in a position of leadership, they are not well distributed throughout the United States. If the continental United States is divided into the six major regions¹ used by

¹The six major regions are as follows: Northeast region--

Howard Odum,¹ these thirty-one institutions are concentrated in the Northeast and Middle States regions; in fact, these two regions, with eleven each, plus the states of California and North Carolina account for twenty-seven of the thirty-one institutions. Not only would the concentration of these thirty-one institutions affect the national patterns, but there are also institutions which, although not members of the organization, are approved by the Association of American Universities and which reach large numbers of graduate students in a wide variety of fields.

It is reasonable to assume that an institution's service to the surrounding population is limited or affected by the number of fields or subjects in which it offers work, for it is necessary for students to travel farther from their homes for instruction in those fields in which neighboring institutions do not offer work on the level desired. For this reason, the principle of selecting the institutions for this phase of the study on the basis of the number of fields in which they offered the Doctor's degree was adopted, although no attempt was made to measure the quality of instruction.

In order to classify the institutions according to the number of fields in which work at the Doctor's level was offered, it was necessary to build up a combined list of fields for the various institutions included in the study; the combined list was discussed earlier in this chapter.² Since there were wide variations in the work offered in many of the fields included in the combined list, weights were assigned to each field of the selected institutions. The weighting of a field at any institution was de-

Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Delaware, and West Virginia; Southeast region--Virginia, North Carolina, Tennessee, Louisiana, Kentucky, Mississippi, Arkansas, South Carolina, Georgia, Florida, and Alabama; Middle States region--Michigan, Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin, and Minnesota; Northwest region--Kansas, Nebraska, Colorado, Wyoming, North Dakota, South Dakota, Montana, Idaho, Utah, and Yellowstone National Park; Southwest region--Oklahoma, Texas, New Mexico, and Arizona; Far West region--Nevada, California, Oregon, and Washington.

¹Howard W. Odum, Southern Regions of the United States, p. 6. Chapel Hill: University of North Carolina Press, 1936.

²Supra, p. 5.

terminated by the diversity of work offered in that field, for example, an institution which offered doctorates in Spanish, French, and German was assigned a "field weight" of three in modern languages.

Using the weighting of the fields as given in Table 60 of Appendix IV, those fifty-five institutions which had total field weights of thirteen or more were selected to be used in securing and studying the national patterns of graduate instruction. The weighting of thirteen was used because of the break in the distribution which came at this point and, even more important, because of the relatively even distribution of these field weights among the five broader areas of learning, as shown in Appendix VIII.¹ The remaining thirty-three institutions had field weights below twelve, and their fields were less evenly distributed among the five areas of learning.

The general regional patterns for the fifty-five institutions compared with those for the eighty-eight show that a larger percentage of the fifty-five than of the eighty-eight are located in the Middle States and the Far West regions, whereas a larger percentage of the eighty-eight than of the fifty-five are located in the remaining four regions. Since such large numbers of the institutions in both groups are located in the Northeast region, it is of especial import that there is little discrepancy in the percentages for this region.

Column 6 of Table 3 gives for each region the percentage of its portion of the eighty-eight institutions which are included in the fifty-five. It will be noted that the percentages for the Middle States and Far West regions are above 62.5, which is the percentage obtained when the institutions in all six regions are combined, whereas the percentages for the remaining four regions are below it. The percentage for the Northeast region is 59.5 and is reasonably close to 62.5; but the percentage for the Southwest region, 25.0, is far below 62.5.

Of even more significance than the number of institutions located in each region were the distribution of the homes of the students and the distribution of the population who should have had an opportunity to attend these institutions for the types of instruction included in this study. The total number of students

¹The five broader areas are listed on pp. 5-6.

TABLE 3

REGIONAL PATTERNS FORMED BY THE LOCATIONS OF THE FIFTY-FIVE INSTITUTIONS AND THE EIGHTY-EIGHT INSTITUTIONS

Region	Fifty-five Selected Institutions		Eighty-eight Selected Institutions		Percentage the Fifty-five Selected Institutions Are of the Eighty-eight
	Number	Percentage of Total	Number	Percentage of Total	
(1)	(2)	(3)	(4)	(5)	(6)
Northeast.....	22	40.0	37	42.0	59.5
Middle States..	17	30.9	21	23.9	81.0
Southeast.....	5	9.1	11	12.5	45.5
Southwest.....	1	1.8	4	4.5	25.0
Northwest.....	3	5.5	7	8.0	42.9
Far West.....	7	12.7	8	9.1	87.5
All six regions	55	100.0	88	100.0	62.5

for all six regions was 44,326, and the population¹ totaled 20,703,986. When the number of students was divided by the population, the result was 0.002141, or 0.2141 per cent. On this basis, one person out of every 467 in the twenty-to-twenty-nine-year age group should have been one of the graduate students included in the study.

If graduate students should be distributed according to population, the quota of expected graduate students for any area could be obtained by multiplying the population of that area by 0.002141. Hereafter the terms "quota" and "quota of expected graduate students" are used to designate the number of students any given area would have produced if it had equalled the national average. By proper selection the quotas could be filled with individuals having I.Q.'s of 150 or more.^{2,3}

The data of Table 4 present evidence that the regional

¹It will be recalled from page 3 that the term "population" is used to indicate population aged twenty to twenty-nine, inclusive.

²Lewis M. Terman and Maud A. Merrill, Measuring Intelligence, p. 42. Boston: Houghton Mifflin Company, 1937.

³M. A. Merrill, "Significance of I.Q.'s on the Revised Stanford-Binet Scales," Journal of Educational Psychology, XXIX (December, 1938), 650.

distribution of the homes of the students who attended the fifty-five selected institutions is similar to that of the homes of those who attended the larger group of institutions, although both of these patterns deviate from the pattern of the quotas. These deviations are more marked in the Northeast and Southeast regions.

TABLE 4

REGIONAL PATTERNS OF THE QUOTAS OF GRADUATE STUDENTS
AND OF THE HOMES OF STUDENTS WHO ATTENDED TWO
GROUPS OF SELECTED INSTITUTIONS

Region	Expected Graduate Students		Eighty-eight Selected Institutions		Fifty-five Selected Institutions	
	Quota	Percent-age	Number of Students	Percent-age	Number of Students	Percent-age
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Northeast....	13,813.1	31.2	19,671	44.4	18,617	45.1
Middle States	12,035.9	27.2	13,654	30.8	13,402	32.4
Southeast....	9,409.4	21.2	3,263	7.4	2,363	5.7
Southwest....	3,558.2	8.0	1,704	3.8	1,106	2.7
Northwest...	2,539.3	5.7	2,082	4.7	1,932	4.7
Far West....	2,970.2	6.7	3,896	8.8	3,832	9.3
Address in-complete..	.....	.....	56	0.1	56	0.1
All six re-gions.....	44,326.1	100.0	44,326	100.0	41,308	100.0

Analysis of the Extent to Which the Student
Lists Contained Complete Information

Range of years.--The available lists of students for the institutions included in the study ranged from 1933-34 to 1937-38;¹ on a study of this kind, however, the national patterns should not be greatly affected unless the range of years was unreasonably large. Foster and Dwyer in their study of the geographic distribution of students have commented upon the variation from year to year thus:

¹The eighty-eight institutions are grouped in Appendix IX according to the years for which their lists were used.

Although our figures cover a small range of years, it is evident that, with a few exceptions, geographic distribution does not change appreciably from year to year.¹

The years for which lists of students were used, information as to the number of institutions having lists in each given academic year, and the number of students affected are given in Table 5.

TABLE 5
YEARS FOR WHICH THE STUDENT
LISTS WERE OBTAINED

Year	Number of Institutions ^a	Number of Students
1933-34...	2	126
1934-35...	14	6,050
1935-36...	44	26,834
1936-37...	13	8,410
1937-38...	12	2,906
No list...	4	.....
Total...	89 ^b	44,326

^aA list of the code numbers of the institutions which appear under each category or year may be found in Appendix IX.

^bNo. 52 and No. 52a are treated as separate institutions.

Dates of publication of the lists.--In any given institution the roster of students may be affected by the time of the year that the list is compiled, for the list may be compiled so that only students for the fall term are included, although in most institutions it is true that the second term does not cause so great a change in student personnel as does the first, or fall, term.

Table 6 gives the months of publication for those lists which were published during the school year. In a number of cases the year but not the month of publication was given. Many rosters were published after the year was completed; or, as in the Harvard

¹Foster and Dwyer, A Study of the Geographic Distribution of Students in 363 American Colleges and Universities, op. cit., p. 8.

University catalogue, each catalogue contained a supplement to correct the list given in the previous catalogue, thereby completing the roster of students for the previous year. Although some of the lists were compiled during the fall term, as shown by the dates of publication, a majority of the students are from rosters which gave the student personnel for the entire academic year.

TABLE 6
DATES OF PUBLICATION OF THE STUDENT LISTS

Date ^a	Number of Institutions ^b	Number of Students
During the school year:		
October.....	4	1,184
November.....	10	4,837
December.....	2	238
January.....	3	485
February.....	4 ^c	2,397
March.....	10 ^d	2,026
April.....	4	2,269
May.....	4	8,117
June.....	8	3,483
After the year.....	28 ^e	15,111
Exact date not given.....	8	4,179
No list.....	4	.....
Total.....	89 ^f	44,326

^aIf several dates were given, the most recent date appearing on the appropriate section or supplement was used.

^bSee Appendix X for the code numbers of the institutions appearing under each category or row.

^cThe University of Florida list contained the students (28) for the first semester only.

^dThe New York State College of Forestry list contained students (32) for the second semester only.

^eThe catalogue of the University of Missouri gives the "List of Students June 1, 1936-June 1, 1937"; the list separating the graduate students attending during the academic year, 1936-37, from those attending during the summer of 1936 only was compiled by the Registrar's Office and sent to the writer in April, 1938. This list was placed in the group of those compiled "after the year."

^fNo. 52 and No. 52a are treated as separate institutions.

Indication of students' major fields.--Even though this study was designed to include only those graduate students who were taking their major work in a field or department in which the institution they were attending offered one of the selected doctorates, a number of the institutions did not have lists of their graduate students giving the fields in which the students had majored; and in some cases officials stated in their correspondence that it was impossible to obtain such a list. Table 7 shows, however, that for 69.3 per cent of the students their major field of work was indicated. The smaller institutions showed a stronger tendency to indicate the student's major field of interest--it is obvious that such an undertaking would increase in difficulty and expense as the enrolment increased.

In the first three categories of Table 7 the lists used indicated the students' major fields of interest. In the second and third categories the fields were not marked for some of the students; the absence of the indication might have been due to an oversight, a clerical error, special or irregular students, the student's failure to complete the records, or a combination of these factors. In the fourth category, "a few schools or divisions but no fields indicated in the student lists," the students taking work in certain professional schools of these institutions were indicated, or they appeared in separate lists. A few large professional schools, for example, Teachers College, Columbia University, make the total number of students with majors indicated larger than the remaining number of graduate students in the institutions in this category.

According to Table 7, the individual's major field was not indicated for 30.7 per cent of the students. Undoubtedly a part of these students were taking work in departments in which none of the selected doctorates were offered; if it had been possible to identify these students, they would have been excluded. Furthermore, in several institutions it was possible to obtain only incomplete lists, for example, lists of successful doctorate candidates. Such variations were not desirable, but they were not of sufficient importance to invalidate the study.¹

¹A more complete discussion of these variations can be found in Appendix XII.

TABLE 7

CLASSIFICATION OF THE STUDENT LISTS ACCORDING TO INFORMATION
ON THE FIELDS IN WHICH THE STUDENTS MAJORED

Classification	Number of Insti- tutions ^a	Number of Students		
		Student's Major Indicated	Student's Major Not Indicated	Total
Fields given for all stu- dents.....	42 ^b	7,986	.....	7,986
Fields given for 97 to 100 per cent of students....	11	10,809	110	10,919
Fields given for majority but less than 97 per cent of students.....	5	2,928	403	3,331
A few schools or divisions but no fields indicated in the student lists....	10	8,993	6,897	15,890
No fields or schools indi- cated in the student lists.....	17	.....	6,200	6,200
No satisfactory list of students available.....	4	.....	.....	.....
Total.....	89 ^b	30,716	13,610	44,326
Per cent.....	.....	69.3	30.7	100.0

^aSee Appendix XI for the code numbers of the institutions which appear under each category.

^bBecause the lists were separate and were obtained from different individuals, No. 52 and No. 52a are treated as separate institutions.

The Reliability of Student Addresses

Since the addresses were obtained for so many students from a number of different types of sources and from a variety of institutions, it appeared judicious to check the addresses for reliability. A form letter with return postcard enclosed was sent via first-class mail to each student whose address was checked for reliability, asking him not only to indicate his correct address but also to indicate the reason he considered it his correct address.¹

¹A detailed discussion of the techniques used in this phase of the study is given in Appendix XIII. A complete report of the results is also given in this Appendix.

Of the 1,515 letters which were mailed to students enrolled in twelve of the eighty-eight institutions, cards were returned by 1,045, or 69.0 per cent. In these replies 93.6 per cent verified the addresses which were given in the student lists, and the 6.4 per cent who corrected their addresses were rather evenly balanced as far as changing the distance from the institution was concerned.

Plans for Following Chapters

The present chapter has dealt with previous studies; with the purposes, methods, and procedures of this study; and with the completeness and reliability of certain phases of the information used. Chapter ii will deal with the drawing power of the individual institutions as well as with the drawing power of various groups of institutions. Chapter iii will compare in detail the distribution of the homes of the graduate students included in the study with the distribution of certain related factors. Chapter iv will consider the extent to which the graduate institutions serve the population as shown by various factors. The final chapter will give the summary and conclusions.

CHAPTER II

INSTITUTIONAL SPHERES OF INFLUENCE

Introduction

The drawing power or the sphere of influence of an institution may be measured by determining the distance its students travel to attend it,¹ and comparisons may be made of such data for individual institutions as well as for selected groups of institutions. Throughout this chapter the patterns established by the entire group of eighty-eight institutions are compared with the patterns established by the fifty-five selected institutions.² In general, the names of individual institutions are not given in the comparisons of the distances traveled by the students; but where it is of value in the study, names are given of institutions whose officers did not object to such comparisons.³

Patterns Formed by the "Average Institution"

The sphere of influence of the average institution for the entire list of eighty-eight gives one presentation of the national patterns. Table 8 contains figures for this average institution. Column 3 gives the percentages of students whose homes were located in the various bands, and Column 6 gives the percentages of students whose homes were located within the cumulative zones. Nearly 45 per cent of the students came from the county in which the institution attended is located, approximately three-fifths of the

¹This discussion includes only those students whose homes were located in the forty-eight states and the District of Columbia.

²It will be recalled from chapter I that satisfactory lists could not be obtained from certain institutions; as a result, these institutions could not be included in this phase of the study.

³The officers of a few institutions were apprehensive of comparisons of the distances traveled by their students, and in two cases the promise was specifically given that their institutions would not be named in such comparisons.

TABLE 8

STUDENTS' HOMES LOCATED IN THE VARIOUS ZONES COMPARED
WITH THE POPULATION^a RESIDING THEREIN^b

Zones ^c	Percentage of:			Cumulative Percentage of:		
	Students' Homes (54 Insti- tutions) ^d	Students' Homes (84 Insti- tutions) ^e	Popu- la- tion	Students' Homes (54 Insti- tutions) ^d	Students' Homes (84 Insti- tutions) ^e	Popu- la- tion
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Home county.	44.9	44.1	0.8	44.9	44.1	0.8
1-25.....	7.4	7.6	0.3	52.3	51.7	1.1
26-50.....	7.7	7.9	0.9	60.0	59.6	2.0
51-100.....	7.1	7.3	2.3	67.1	66.9	4.3
101-250.....	11.1	11.4	10.0	78.2	78.3	14.3
251-500.....	8.1	8.2	20.0	86.3	86.5	34.3
501-1,000...	7.7	7.7	34.4	94.0	94.2	68.7
Over 1,000..	5.9	5.7	31.3	99.9	99.9	100.0
Address in- complete..	0.1	0.1	.....	0.1	0.1	.....
All bands...	100.0	100.0	100.0	100.0	100.0	100.0

^aThe term "population" is used throughout the study to indicate the population aged 20-29.

^bThese percentages are based upon the figures for the "average institution." The figures for the respective institutions were added then the total was divided by the number of institutions.

^cSee page 9 for explanation of the zones.

^dIt will be recalled that no satisfactory list of students was obtained from Institution No. 17.

^eIt will be recalled that no satisfactory lists of students were obtained from the institutions having code numbers of 16, 17, 30, and 35.

students had homes located within 50 miles of the institution they attended, over two-thirds traveled not more than 100 miles, and nearly seven-eighths had homes located within a radius of 500 miles of the institution attended; only 5.7 per cent of the students attending an institution came from homes located over 1,000 miles from it.

Column 4 shows the distribution of the population through the various zones whereas Column 7 gives the percentage of the population within various radii of miles from the institution.

The distribution of the population contrasts quite markedly with the distribution of the students' homes--whereas 44.1 per cent of the students lived in the county in which the institution they attended is located, only 0.8 per cent of the population resided there; even though 66.9 per cent of the students' homes were within 100 miles, only 4.3 per cent of the population resided in this area; and, although nearly seven-eighths of the students' homes were within 500 miles, only slightly more than one-third of the population resided there.

The distribution of students' homes for the average institution of the fifty-five selected for special study is found in Columns 2 and 5. The data presented in Table 8 indicate that the fifty-five selected institutions as a group did not differ significantly from the eighty-eight institutions in the distances students traveled to attend them.

Patterns Formed by the Percentages of Students' Homes Located in Selected Areas

In the previous section the data are based upon the average, but the average--in contrast with the median--is sensitive to the influence of larger institutions. The present section treats the number of institutions with various percentages of their students whose homes were located within selected areas. The percentages for the median institution as well as the percentages exceeded by nine-tenths and one-tenth of the institutions, respectively, are also given for these areas.

The distribution of institutions according to the percentages of their students whose homes were located in the same counties as the institutions they attended shows, in Table 9, that for the median institution over one-third of its students came from the county in which the institution is located. In nine-tenths of the institutions at least 13 per cent of their students came from the home counties of the institutions, and in one-tenth of the institutions over 67.2 per cent of their students came from these home counties. Seventeen, or nearly 20 per cent, of these institutions obtained over half of their graduate students from the local county.

The median institution obtained 49.1 per cent--practically one-half--of its students from homes within 50 miles, nine-tenths of the institutions drew more than 22.8 per cent of their students

TABLE 9

NUMBERS OF INSTITUTIONS WITH INDICATED PERCENTAGES
OF STUDENTS RESIDING IN SELECTED AREAS

Percentage of Students	Home County ^a	Within Radius of 50 Miles ^b	Within Radius of 100 Miles ^b	Home State ^c	Within Radius of 250 Miles ^b	Home Region ^f	Within Radius of 500 Miles ^b	Within Radius of 1,000 Miles ^b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
91.00-100.00	...	1	7	7	15	19	33	59
81.00- 90.99	1	5	7	17	18	25	19	19
71.00- 80.99	5	8	10	12	15	20	19	3
61.00- 70.99	6	9	10	13	15	10	6	1
51.00- 60.99	5	15	22	6	12	4	4	1
41.00- 50.99	14	18	10	13	4	4	1	...
31.00- 40.99	18	8	12	7	2	1	1	...
21.00- 30.99	13	13	2	3	...	...	...	...
11.00- 20.99	16	4	1	4	2	...	...	...
1.00- 10.99	5	2	2	1	...	...	...	...
Total number of institutions	83 ^d	83	83	83	83	83	83	83
Percentages for insti- tution ex- ceeded by nine-tenths of the in- stitutions.	13.0	22.8	33.8	31.4	51.3	59.3	64.8	82.7
Percentages for the me- dian insti- tution.....	35.2	49.1	57.6	66.8	75.3	82.0	86.5	94.0
Percentages for insti- tution ex- ceeded by one-tenth of the in- stitutions	67.2	78.1	89.1	90.2	95.5	96.6	98.5	99.6

^aFor those institutions which have branches, this column gives data for the main institutions only, and the branches are ignored except for No. 36. Nos. 52 and 52a are not handled separately.

^bFor these columns the data are given only for the main institutions, and all branches are ignored. Nos. 52 and 52a are not handled separately.

^cFor these columns the data include those for the branches as well as those for the main institutions.

^dThis total is 83 since satisfactory lists of students were not obtained from Institutions Nos. 16, 17, 30, and 35 and because the list from No. 34 was unsatisfactory for comparisons of institutional percentages.

from within this area, and 10 per cent of the institutions secured over three-fourths of their students from such an area. The area within a radius of 100 miles provided the median institution with 57.6 per cent of its students. This median institution also obtained slightly more than three-fourths of its student body from within a 250-mile radius, whereas nine-tenths of the institutions obtained at least one-half of their students and one-tenth of the institutions obtained over 95 per cent of their students from within this area. In fact, only four institutions received less than 41 per cent of their students from homes within the 250-mile radius, and only eight institutions received less than 51 per cent from homes within this radius.

In half of the institutions less than 15 per cent of their students had homes beyond 500 miles from the institution, nine-tenths had 64.8 per cent or more of their students from within 500 miles, and one-tenth of the institutions had at least 98.5 per cent of their students from this area. From the area within a radius of 1,000 miles half of the institutions obtained at least 94.0 per cent of their students--in fact, only two institutions had less than 71 per cent of their students from within this area, and only five had less than 81 per cent.

In some cases the circles or bands did not present a true picture of an institution's sphere of influence. For example, an institution which is supported and controlled by a particular area, such as a state, may draw its students for the most part from that constituency; but, because of the shape of the area or the location of the institution within it, this area may be cut by a number of zones so that the use of the zones makes it appear that the institution drew from a larger section of the United States than was actually the case.

The distribution of the institutions according to the percentage of their students who were residents of the state in which the various institutions are located shows that in half the institutions over two-thirds of the students had homes in the state in which the institution they attended is located; in nine-tenths of the institutions 31.4 per cent or more of their students were inhabitants of the home state of the institution in which they were enrolled; and in at least one-tenth of the institutions over 90 per cent of the students were inhabitants of the home state of the institution at which they were studying. Only fifteen institutions

drew more than 59 per cent of their students from outside the home state of the institution.

The median institution obtained 82.0 per cent of its students from its home region¹ while nine-tenths of the institutions obtained at least 59.3 per cent and one-tenth of the institutions secured 96.6 per cent of their students from their home regions. In nineteen institutions 91 per cent or more of the students came from the regions in which their respective institutions are located, and in only nine institutions was the percentage less than 61.0.

It will be noted from Table 9 that the median institution received 35.2 per cent of its students from homes which were located in the same county as the institution they attended; this is considerably lower than the average of 44.1 per cent which was given in Table 8. Part of the difference can be explained by the omission of Institution No. 34 from Table 9, part may be a result of the difference in type of measure of central tendency which was used, and a part may be explained by the fact that larger institutions--especially those located in more populous areas--apparently drew larger percentages of their students from the counties in which they are located. Again, the median institution received 49.1 per cent of its students from the area within 50 miles compared with the 59.6 per cent received by the average institution. For the 100-mile radius the difference decreased slightly with 57.6 per cent for the median institution and 66.9 per cent for the average institution. There was a marked reduction in the difference for the area within a 250-mile radius in that for the median institution the figure was 75.3 per cent and for the average institution, 78.3 per cent. For areas having radii of more than 250 miles, the differences were negligible.

Patterns Formed by Certain Groups of Selected Institutions

The first decile, median, and ninth decile data for the fifty-five institutions, as given in Table 10, show a marked similarity to parallel data given in Table 9 for the eighty-eight institutions. As can be expected, the variations were greater between the figures for the first deciles and the ninth deciles than

¹The states included in each region are given on pp. 9-10.

they were between the medians for the two groups. In Figure 1 the comparisons are given in graphic form.

In order to discover whether or not the smaller institutions offering work in a limited number of fields tended to make the entire group of institutions appear to be more local in their spheres of influence, the medians for specific areas were computed for three other groups of selected institutions, as shown in Table 10. The first group was made up of the thirty-one institutional members of the Association of American Universities which are located in the United States. The median percentages of these thirty-one institutions tended to be slightly lower than those for the fifty-five, but the greatest variation was 1.5 per cent; this variation occurred for the area within a radius of 250 miles.

For the sixteen institutions which Laurence Foster listed as the ranking and strongest graduate institutions in the United States¹ the medians were smaller than those for the thirty-one institutions; and for the eleven ranking institutions which Edwin R. Embree selected, the medians were again smaller.² Each institution in Embree's list of eleven was included in Foster's sixteen, and each of the sixteen was included in the thirty-one members of the Association of American Universities. Only one of these thirty-one institutions--Clark University--was not included in the fifty-five selected institutions.³

In even the smallest median percentages--those for Embree's eleven institutions--over one-fourth of the students attended institutions located in their home counties; nearly three-fifths, in their home states; and nearly three-fourths, in their home regions. Likewise, over two-fifths came from within 50 miles; over half, from within 100 miles; and over two-thirds, from within 250 miles.

It is not surprising that of the five groups of selected institutions compared, the group containing the smallest number of institutions, namely, Embree's eleven, was the least local in its sphere of influence; none the less it, too, was exceedingly local.

¹Laurence Foster, op. cit., pp. 52-53.

²Edwin R. Embree, op. cit., p. 655.

³Foster's and Embree's groups are given in Appendixes XIV and XV, and the other groups are given in Appendix I.

TABLE 10

PERCENTAGES OF STUDENTS WHOSE HOMES WERE LOCATED IN SELECTED
AREAS FOR CERTAIN GROUPS OF INSTITUTIONS

Group	Measure	Home County	Within Radius of 50 Miles
Fifty-five selected institutions ^a	1st decile	13.5	24.3
Fifty-five selected institutions ^a	9th decile	66.4	77.2
Fifty-five selected institutions ^a	Median	33.9	48.5
Thirty-one institutional members of the Association of American Universities.....	Median	32.9	48.0
Foster's sixteen ranking institu- tions.....	Median	28.5	45.8
Embree's eleven ranking institu- tions.....	Median	26.8	43.3

^aThese figures are based on the student lists of 53 in-
stitutions in that no satisfactory list was received from No. 17,
and the list obtained from No. 34 would distort the picture in a
comparison of individual institutions.

TABLE 10--Continued

Within Radius of 100 Miles	Home State	Within Radius of 250 Miles	Home Region	Within Radius of 500 Miles	Within Radius of 1,000 Miles
36.4	36.8	54.3	62.9	69.6	82.7
86.4	89.6	93.4	95.1	98.2	99.6
58.3	66.5	75.6	82.7	86.0	93.8
57.9	66.0	74.1	82.1	86.0	93.6
55.9	65.0	68.9	80.3	82.2	93.0
53.6	58.0	67.2	74.3	80.9	92.7

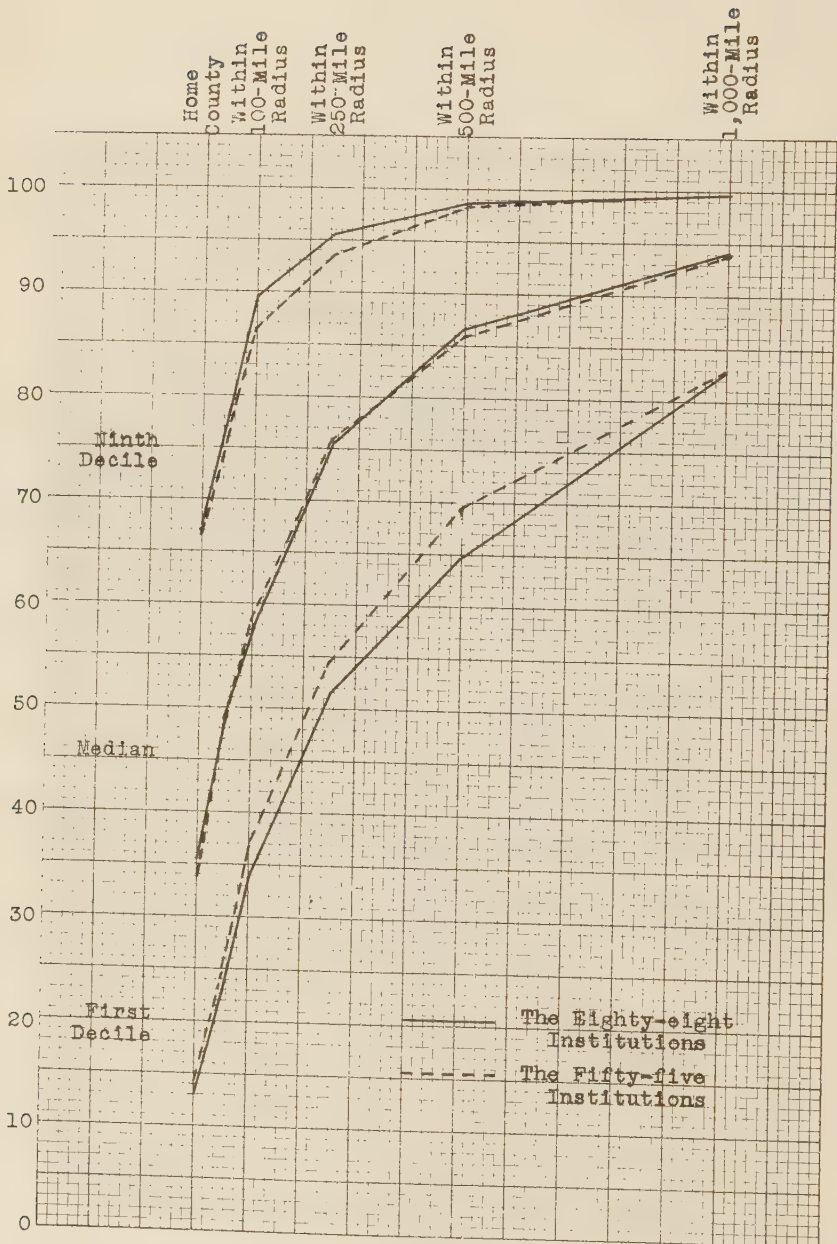


Fig. 1.--Comparisons of the first deciles, medians, and ninth deciles of the percentages of students whose homes were located in selected areas for the eighty-eight institutions with parallel figures for the fifty-five institutions.

Selected Illustrations of Institutional Spheres of Influence

Additional interesting facts may be seen by examining the spheres of influence of those institutions which had the lowest as well as those which had the highest percentages of students who were residents of the counties in which the institutions are located. There are five institutions which had less than 10 per cent of their students coming from the home counties of the institutions. Three of these institutions with an aggregate enrolment of 157 gave work in only one or two fields; one of these three institutions--the Colorado State College of Education--included only candidates for the doctorate in their list of students, and 66.2 per cent of them came from five states. The two largest institutions in this group of five are Princeton University and the University of Virginia; only 18.8 per cent of the students of Princeton University were from New Jersey, 38.6 per cent were from within 100 miles, and 54.1 per cent were from two states; the University of Virginia obtained 51.6 per cent of its students from within 100 miles, 64.6 per cent from Virginia, and 72.9 per cent from three states.

At the other extreme, one institution--the Polytechnic Institute of Brooklyn--drew 81.1 per cent of its students from Greater New York City,¹ and five other institutions obtained over 71 per cent of their students from the counties in which they are located. All six of these acquired more than 88 per cent of their students from their home regions and over 98 per cent from within 1,000 miles. Three of the six are included in the fifty-five selected institutions, and one is a member of the Association of American Universities.

In five institutions fewer than 80 per cent of their student bodies came from within 1,000 miles. The California Institute of Technology had 36.1 per cent of its students from its home county of Los Angeles; 43.8, from California; and 50.0, from the two states of California and New York. The list from the Michigan State College of Agriculture and Applied Science consisted of suc-

¹Greater New York City is made up of five counties, but in this study the city has been treated as one county. Most of the students' addresses were given as New York, New York, and from such addresses it was not possible to identify the inhabitants of each of the five counties.

successful doctorate candidates only; in this list 15.4 per cent were from the home county, and 53.8 per cent were from Michigan. At the Hartford Seminary Foundation 34.0 per cent came from the home county, and over 50 per cent came from within 100 miles. At Tulane University only two of the nine students came from the home state, and these were from New Orleans County. Of the list from the Massachusetts Institute of Technology 11.3 per cent came from Middlesex County; 28.7, from Massachusetts; and 60.7, from six states.

In contrast, thirteen institutions--none of which are included in the fifty-five selected institutions--had an aggregate enrolment of 1,148 students, and all of these students came from within radii of 1,000 miles of the various institutions. For one institution which is located in a metropolitan area all students lived within 50 miles, and for three other institutions all the students lived within radii of 500 miles; the total graduate enrolment of these four institutions was 420 students. Of the thirteen institutions, all but three small ones received more than three-fourths of their students from the home counties of the institutions.

In addition to the thirteen institutions discussed above, there are twenty-one institutions which drew from 97.7 to 99.4 per cent, inclusive, of their students from within 1,000 miles. A total of thirty-four of the eighty-three institutions, therefore, obtained at least 97.7 per cent of their student bodies from within radii of 1,000 miles. Nine of the thirty-four are members of the Association of American Universities, and eighteen are included in the fifty-five selected institutions.

Preliminary examination of the data indicated that in a number of institutions large percentages of the students came from a few counties which were not necessarily contiguous. No effort was made to get a complete list of these cases, but an attempt was made to select some of the more striking illustrations. Table 11 shows that in thirty-five different institutions large portions of the student bodies came from a small number of counties. The selections, not only of the institutions but also of the number of counties, were made arbitrarily to illustrate that in many cases large percentages of student bodies came from a few counties. In each case the number of counties which gave the most striking percentage of students was used. Thirty of these institutions are

included in the group of fifty-five selected institutions, and seventeen are institutional members of the Association of American Universities. While studying Table 11 the reader should keep in mind the fact that in this study the District of Columbia is treated as a county as also is Greater New York City.

TABLE 11

THE DISTRIBUTION OF A SELECTED GROUP OF INSTITUTIONS
WHICH HAD RELATIVELY HIGH PERCENTAGES OF THEIR
STUDENTS FROM A SMALL NUMBER OF COUNTIES

Number of Counties	Number of Institutions Having Each Range of Percentages of Students from Each Indicated Number of Counties						Total Number of Institutions
	31.00- 40.99	41.00- 50.99	51.00- 60.99	61.00- 70.99	71.00- 80.99	81.00- 90.99	
2.....	1	7	3	1	...	1	13
3.....	2	1	...	2	1	1	7
4.....	2	1	1	...	3	...	7
5.....	...	...	2	...	...	...	2
6.....	...	...	1	...	1	1	3
7.....	...	...	...	3	...	...	3
Total num- ber of in- stitutions	5	9	7	6	5	3	35

The following are examples taken from a few well-known graduate institutions in the United States--the counties are not adjacent unless that fact is stated: 67.1 per cent of the students attending Columbia University were from 7 contiguous counties (Greater New York City and 6 other counties); 33.9 per cent at Harvard from 8 contiguous counties in Massachusetts and 52.0 per cent from 18 counties; 45.5 per cent at Johns Hopkins University from 2 counties (Baltimore County¹ and Greater New York City); 64.2 per cent at Stanford from 7 counties in California; 59.8 per cent at the University of California from 6 counties in California; 62.9 per cent at the University of Chicago from 19 counties; 43.1 per cent at the University of Michigan from 2 contiguous counties in Michigan; 56.5 per cent at the University of Minnesota from 2 contiguous counties in Minnesota and 61.5 per cent from 5 counties;

¹See Appendix VII.

77.6 per cent at the University of Pennsylvania from 8 contiguous counties in Pennsylvania and New Jersey and 87.0 per cent from 17 counties; 65.9 per cent at Washington University from 2 contiguous counties (St. Louis County,¹ Missouri, and St. Clair County, Illinois); and 31.0 per cent at Yale University from 3 contiguous counties in Connecticut and 46.4 per cent from 11 counties.

These facts show that even large, wealthy, and highly respected universities usually draw large percentages of their graduate students from a few counties or from relatively small areas near the university. Schools which offer training in selected fields, for example, California Institute of Technology and Massachusetts Institute of Technology, apparently draw larger percentages of their students from areas outside a thousand-mile radius than do universities which offer work in a larger number of fields.

Extent to Which Students Who Were Residing in
Home Counties of Institutions Went Outside
Their Home Counties for Instruction

One may ask to what extent students who lived in counties in which institutions are located attended institutions located outside those counties. In other words, did students who had homes in a county in which an institution is located attend only that institution?

Of the 3,067 counties² in the United States there are 75 in each of which is located at least one institution or a branch of an institution included in this study. Of the 44,326 students who were attending the eighty-four institutions for which lists were obtained, 25,311 were from these 75 counties, and, of these 25,311 students, 19,558 attended institutions located in their home counties, while 5,753 attended institutions located outside their home counties. The remaining 18,959 students had homes in the 2,992 counties in which none of the eighty-four institutions are located. On the basis of the quotas,³ there should have been 13,224 students residing in the 75 counties in place of the 25,311 who did reside there, and from the remaining 2,992 counties there should have been 31,103 students in place of the 18,959.

For the 3,067 counties the average number of students was

¹Ibid.

²Ibid.

³A definition of the term "quota" is given on page 12.

14. The average for the 75 counties containing graduate institutions was 338, of which 261 attended institutions located in their home counties and 77 attended institutions located outside their home counties. On the other hand, the average for the remaining 2,992 counties was only 6 students. On the basis of their quotas, the average for the 75 counties should have been 176; and for the 2,992 counties the average should have been 10.

The ratio of students to aggregate quotas for the 3,067 counties was 100:100, but for the 75 counties the ratio was 191:100 with a ratio of 147:100 for those who were attending institutions located in their home counties and a ratio of 44:100 for those who were going outside their home counties; in contrast, the ratio for the 2,992 counties was 61:100. It can be seen, therefore, that the ratio for students from the 75 counties who attended institutions outside their home counties was over two-thirds as large as the ratio for the 2,992 counties, notwithstanding the fact that so many students from these 75 counties were attending institutions located in their home counties.

It is obvious from the data presented that areas which are relatively near the institutions produced many more scholars in proportion to their population than did areas which are relatively remote from institutions. In other words, the scholarly propensities of a given population increase with proximity to a graduate school.

Drawing Power of Institutions by Regions

Although chapter iii¹ contains a detailed discussion of the spheres of influence of the institutions which were studied by examining the regional distribution of the locations of the institutions and the locations of the homes of the students, it should be mentioned here that the percentages of the institutions located in the Northeast and the Far West regions are larger than their respective percentages of population.

Three of the regions, namely, the Northeast, Middle States, and Far West, had larger percentages of students' homes than they had percentages of the population; and the institutions located in two of these, namely, the Northeast and Middle States regions, drew still more students from the other regions. In the Far West the percentage of population was smaller than either the percentage

¹See pp. 37-43.

of students' homes or the percentage of students who were attending institutions located in that region; the latter percentage, however, was slightly smaller than the percentage of students' homes, thus giving the schools in this region a net loss on the regional exchange of students.

Less than 10 per cent of the students attended institutions located in the Southeast, the Southwest, and the Northwest combined, even though the homes of over 15 per cent of the students were located in these three regions and nearly 35 per cent of the population resided there. Of these three, the loss in the regional exchange of students was most marked in the Southeast region.

The data indicate that those regions which had a greater part of the population and which contained more institutions--especially institutions offering work in a variety of fields--not only had in attendance a greater proportion of the population who were residents of that region but they also gained still more students in the regional exchange.

Expected Travel-Distance for Graduate Students on the Doctorate Level

Even though many graduate students cross state and regional lines and many others travel a thousand or more miles to receive instruction, various tables in this chapter have shown that the drawing power of institutions is inversely related to distance. It would be a worth-while project, therefore, to find at what point distance became a serious handicap to these graduate students. This does not necessarily mean that new institutions must be built in sparsely settled areas where now there are no graduate schools, but it may be wise to increase the quality and number of scholars by equalizing the handicap which distance imposes upon the training of many prospective leaders.

In spite of very large increases in the percentages of population, as given in Column 4 of Table 8 (see p. 20), Column 3 shows a definite and continued drop in the percentages of students in the zones above 250 miles. In Column 6 it is shown that 78.3 per cent of all students lived within a radius of 250 miles of the institution which they attended, whereas in Column 7 it is shown that only 14.3 per cent of the population resided therein.

Column 6 of Table 9 (see p. 22) has the distribution of the eighty-three institutions according to the percentages of their

students who traveled less than 251 miles for instruction. For half of the institutions 75.3 per cent of their students came from within a radius of 250 miles; for nine-tenths of the institutions, 51.3 per cent; and for one-tenth, 95.5. It should be noted that the percentage for the median institution, namely, 75.3, differed from that of the average institution, namely, 78.3, by 3 per cent; this was much smaller than the differences for the 50- and 100-mile radii.

In Table 9 it is seen that only eight institutions, accounting for a total of 1,097 students, had less than 51 per cent of their students from within 250 miles. Seven of these eight institutions gave specialized training. Two of the eight, Massachusetts Institute of Technology and Duke University, with a combined list of 723 students, had more than 45 per cent of their students from within this radius; and two others, California Institute of Technology and Carnegie Institute of Technology, with 208 students, drew more than 41.0 per cent from within 250 miles. These four institutions, which accounted for 931 of the 1,097 students, include three institutions specializing in technical training and one leading southern university.

These data, based on current practice, show that in nearly all institutions a majority, and in most institutions three-fourths, of their students travel less than 251 miles for their graduate instruction. The effective radius from which students were drawn to a graduate school was therefore taken as 250 miles.

Some Factors Which Affected Institutional Spheres of Influence

Although the purpose of this chapter is to discover the drawing power of institutions and not to explain the causes, the discussion must include mention of certain factors which affected the result. The reliability of the home addresses given by the students was checked; but the addresses should be interpreted as the students' correct addresses at the time, for--since there were no indications as to where the students were born or where they were reared--they did not show the extent to which the students or their families had moved to university vicinities in order to facilitate the students' studies.

It is also true that in most cases the county in which the institution is located is more populous than the counties immedi-

ately surrounding it. This fact is shown in Column 4 of Table 8 (see p. 20). The area immediately surrounding an institution also tended to have a higher socio-economic status as measured by the plane-of-living indices used by Carter Goodrich and his associates. With an index of 100 as the national average for the United States, the following are the indices for the various bands around the so-called average institution: home county, 156; 1-25 miles, 139; 26-50, 130; 51-100, 124; 101-250, 115; 251-500, 99; 501-1,000, 91; over 1,000 miles, 100. The index for the area within 250 miles of the institution is 120.

Other factors which would affect the drawing power of an institution include the number of competing institutions in the vicinity; the fields, including number of fields in which instruction is offered; scholarships; restrictions placed upon students as to sex, tuition, and entrance requirements; and finally, to a certain extent, the type of control of an institution.

Regardless of the causes, the facts remain that these graduate institutions are surprisingly local in their spheres of influence and that distance was a serious handicap to prospective graduate students, even though some individual cases may appear to contradict this statement.

CHAPTER III

DISTRIBUTION OF HOMES OF STUDENTS COMPARED WITH CERTAIN RELATED FACTORS

Introduction

This chapter contains not only an examination of the regional¹ distribution of the homes of the students and the locations of the institutions but also a study of the national patterns formed by the distributions of the students, the population, the ratios of these two factors, the density of the student distribution, the density of the population, the indices of graduate-school availability, and the plane-of-living indices.

Distribution of Students According to the Regional Locations of Their Homes and of the Institutions They Were Attending

The regional distributions of the homes of the students and of the locations of the institutions which they were attending are given in Table 12. Column 11 gives the total number of students who were attending the institutions located in the various regions, and the last column gives for each region the total number of students who were attending institutions in that region although they were residents of one of the other five regions. Likewise, Row G gives the aggregate number of students whose homes were located in the various regions regardless of the location of the institution each student attended, and Row H gives the number of students with homes located in each region who were attending institutions located in one of the other five regions. Row I gives the regional distribution of the quotas.

Table 13 shows the percentages of students who were residents of each region who were attending institutions located in each of the six regions; these percentages may be used as one means of measuring the extent to which the institutions of a particular region served that region. By this criterion, the insti-

¹The states included in each region are given on pp. 9-10.

TABLE 12

DISTRIBUTION OF THE STUDENTS ACCORDING TO THE REGIONAL
LOCATIONS OF THEIR HOMES AND OF THE INSTITUTIONS
WHICH THEY WERE ATTENDING

Regions in Which Institutions Are Located	Row	Number of Institutions	Regions in Which		
			Northeast	Middle States	Southeast
(1)	(2)	(3)	(4)	(5)	(6)
Northeast.....	A	34	18,413	1,599	846
Middle States.....	B	20	887	11,730	574
Southeast.....	C	11	189	89	1,779
Southwest.....	D	4	18	21	13
Northwest.....	E	7	19	81	12
Far West.....	F	8	145	134	39
All six regions..	G	84 ^a	19,671	13,654	3,263
Students attending institutions out- side their home regions.....	H	...	1,258	1,924	1,484
Quotas.....	I	...	13,813.1	12,035.9	9,409.4

^aNo satisfactory lists were obtained from Institutions Nos. 16, 17, 30, and 35. Nos. 16, 17, and 35 are located in the Northeast region; and No. 30, in the Middle States region.

TABLE 12--Continued

Students' Homes Were Located					Students from Regions Other Than One in Which Institutions Are Located
Southwest	Northwest	Far West	Address Incomplete	All Six Regions	
(7)	(8)	(1)	(10)	(11)	(12)
257	426	484	7	22,032	3,612
213	606	248	49	14,307	2,528
71	28	13	....	2,169	390
1,069	22	8	....	1,151	82
39	805	6	....	962	157
55	195	3,137	....	3,705	568
1,704	2,082	3,896	56	44,326	7,337
635	1,277	759	....	7,337	.....
3,558.2	2,539.3	2,970.2	....	44,326.1	.....

TABLE 13

PERCENTAGE OF THE STUDENTS WHOSE HOMES WERE LOCATED
IN EACH REGION WHO ATTENDED INSTITUTIONS
IN THE VARIOUS REGIONS^a

Regions in Which Institutions Are Located	Percentage of the Students Whose Homes Were Located in Each Region ^b					
	North- east	Middle States	South- east	South- west	North- west	Far West
Northeast.....	93.6	11.7	25.9	15.1	20.5	12.4
Middle States.....	4.5	85.8	17.6	12.5	29.1	6.4
Southeast.....	1.0	0.7	54.5	4.2	1.3	0.3
Southwest.....	0.1	0.2	0.4	62.7	1.1	0.2
Northwest.....	0.1	0.6	0.4	2.3	38.6	0.2
Far West.....	0.7	1.0	1.2	3.2	9.4	80.5
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Percentage of students who attended insti- tutions located out- side the home region	6.4	14.2	45.5	37.3	61.4	19.5

^aThese percentages were calculated from the figures in Table 12.

^bThe fifty-six students with incomplete addresses were not included in this table.

tutions located in the Northeast region served their home region better than the institutions of any other region served theirs in that 93.6 per cent of the students from the Northeast region attended institutions located there. In two other regions over four-fifths of the students stayed in their home regions, namely, the Middle States with 85.8 per cent and the Far West with 80.5 per cent. Comparable percentages were considerably smaller for the remaining three regions: 62.7 for the Southwest, 54.5 for the Southeast, and 38.6 for the Northwest. Consequently, the range was from 94 out of each 100 students for the Northeast to 39 out of each 100 for the Northwest.

Although these data show the extent to which students were able to obtain the type and quality of instruction they wanted within their home regions, these figures also may indicate the extent to which students from the various regions were inclined to

go to other regions for instruction. Tables 12 and 13 give evidence which tends to support the former point of view. This view is confirmed by the figures in Column 11 of Table 12 because of the 7,337 students who attended institutions located outside the students' home regions nearly half, 3,612, of them attended institutions located in the Northeast region. If the number of students who were enrolled is used as a criterion, the Northeast region not only served the students of its own region best, as shown above, but it also served best the students who attended institutions outside their home regions. Likewise, institutions located in the Middle States served 85.8 per cent of the students who were residents of the Middle States region, and they gave instruction to 2,528 students from other regions. Consequently, the institutions located in these two regions served 6,140 of the 7,337 students who attended institutions outside their home regions. On the other hand, of the students who attended institutions outside their home regions only 82 attended institutions in the Southwest region, a total of 239 attended those in the Southwest and Northwest regions, and only 629 attended institutions located in the Southwest, Northwest, and Southeast regions combined.

Each region sent more than 10 per cent of its students to institutions in the Northeast region; in fact, two regions--the Southeast with 25.9 per cent and the Northwest with 20.5 per cent--sent over 20 per cent of their students to institutions located in the Northeast region. The fact that so many of the students whose homes were located outside the Northeast region attended institutions located in the Northeast is evidence that these students recognized the fact that those who resided in the Northeast did not need to travel outside their home region in order to receive valuable instruction.

Only two regions--the Northeast with 4.5 and the Far West with 6.4--sent less than 10 per cent of their students to institutions located in the Middle States. The Northwest sent 29.1 per cent of its students to the Middle States; it is interesting that this was the highest percentage of students which any one region sent to another region even though the largest number of nonresident graduate students were enrolled in institutions located in the Northeast region.

In Table 14 are found the regional locations of the homes of the students who were enrolled in the institutions of each re-

TABLE 14

PERCENTAGE OF THE STUDENTS ENROLLED IN THE INSTITUTIONS OF EACH REGION WHOSE HOMES WERE IN THE VARIOUS REGIONS^a

Regions in Which Institutions Are Located	Northeast	Regions in Which Students' Homes Were Located							Total Percentage of Enrolment Who Were from Other Regions
		Middle States	Southeast	Southwest	Northwest	Far West	Address Incomplete	Total	
Northeast....	83.6	7.3	3.8	1.2	1.9	2.2	0.03	100.0	16.4
Middle States	6.2	82.0	4.0	1.5	4.3	1.7	0.30	100.0	17.7
Southeast....	8.7	4.1	82.0	3.3	1.3	0.6	....	100.0	18.0
Southwest....	1.6	1.8	1.1	92.9	1.9	0.7	....	100.0	7.1
Northwest....	2.0	8.4	1.2	4.1	83.7	0.7	....	100.0	16.3
Far West.....	3.9	3.6	1.1	1.5	5.2	84.7	....	100.0	15.3

^aThese percentages were calculated from the figures in Table 12.

gion. With the exception of the Southwest region with 92.9 per cent of its students from homes in that region, the range of the percentages of students who were residents of the regions in which they attended institutions was small, namely, from 82.0 to 84.7. In the Far West 15.3 per cent were from other regions with three regions accounting for 12.7 per cent of these. The Northwest and the Northeast regions had 16.3 and 16.4 per cent, respectively, who were not residents of these regions. The Middle States accounted for 8.4 of the 16.3 per cent for the institutions in the Northwest. The Middle States and the Southeast accounted for 11.1 of the 16.4 per cent who attended institutions in the Northeast but did not dwell there.

Eighty-two per cent of the students were residents of the home region of the institutions located in the Middle States¹ as

¹Of the students in the Middle States 0.3 per cent had incomplete addresses. These forty-nine students attended the University of Minnesota which had 75.2 per cent of its students from Minnesota and 84.3 per cent from the Middle States region; thus it may be assumed that practically the entire 0.3 per cent with incomplete addresses was from the Middle States. If this assumption is correct, 17.7 per cent of the students who attended institutions located in the Middle States were from other regions.

well as for those located in the Southeast. Accordingly, for the institutions of five of the regions the percentages of students whose homes were outside the respective home regions of the institutions ranged from 15.3 to 18.0. It will be recalled from the discussion of Table 9 (see p. 22) that the median per cent of the students who were residents of the region in which the institution they attended is located, was 82.0. Naturally, there was considerable variation from institution to institution, as shown in Table 9. The distribution of the 44,326 students among the institutions of the various regions is given in Row C of Table 15.

TABLE 15
THE REGIONAL DISTRIBUTION OF STUDENTS,
INSTITUTIONS, AND POPULATION

Selected Factors	Row	Regional Distribution of Selected Factors						
		North-east	Middle States	South-east	South-west	North-west	Far West	Total
Percentage of population ^a	A	31.2	27.2	21.2	8.0	5.7	6.7	100.0
Percentage of students' homes ^b ...	B	44.4	30.8	7.4	3.8	4.7	8.8	100.0 ^c
Percentage of students who attended institutions in various regions.....	C	49.6	32.3	4.9	2.6	2.2	8.4	100.0
Percentage of institutions ^d	D	40.5	23.8	13.1	4.8	8.3	9.5	100.0
Percentage of selected institutions ^e	E	38.9	31.5	9.2	1.9	5.6	12.9	100.0
Ratio students to quotas ^f	F	142	113	35	48	82	131	100

^aRow A is copied from Column 3 of Table 4.

^bRow B is copied from Column 5 of Table 4.

^cThis number includes 0.1 per cent who had incomplete addresses.

^dRow D differs from Column 5 of Table 3 in that the percentages in Row D are based upon the 84 institutions from which lists of students were obtained.

^eRow E differs from Column 3 of Table 3 in that the percentages in Row E are based upon the 54 institutions from which lists of students were obtained.

^fThe entries in this row represent the number of students with homes located in each region per 100 expected graduate students.

Regional Distribution of Selected Factors

The distribution of the population was unequal in that it ranged from 5.7 per cent in the Northwest region to 31.2 in the Northeast. Each of three regions had more than 21 per cent of the population, and they accounted for 79.6 per cent--nearly four-fifths--of the total, while each of the other three regions had less than 9 per cent but more than 5 per cent. It should be kept in mind that persons aged twenty to twenty-nine are wage earners in the prime of life and, as a result, tend to concentrate around urban centers.¹ It would consequently be logical that an urban population might contain a higher per cent of this age group than a rural population might.

The distribution of the homes of the students differed from the distribution of the population, for--as Row B of Table 15 indicates--the Northeast and Middle States regions each had more than 30 per cent of the students' homes, and the combined percentage of students' homes for these two regions was 75.2. Only 24.8 per cent of the students were found in the remaining four regions; each of these regions contained the homes of less than 9 per cent of the students, and two of them--the Southwest and the Northwest--contained the homes of less than 5 per cent.

The Northeast region, with a student-quota ratio of 142:100, had nearly three students for every two expected; the Far West had nearly four students for every three expected; and the Middle States had approximately eight students for every seven expected. But the Northwest had only about four students for every five expected while in the Southwest there was only one for every two expected, and in the Southeast there was only one for every three expected; the Southeast region had only 7 per cent of the students but 21 per cent of the population whereas the Southwest region had only 4 per cent of the students but 8 per cent of the population. It may be seen from the preceding facts that more students had homes in three of the regions than were expected while three regions had fewer students than were expected.

Institutions located in the Northeast region enrolled nearly half, or 49.6 per cent, of the included students. If the

¹Warren S. Thompson and P. K. Whelpton, Population Trends in the United States, p. 132. New York: McGraw-Hill Publishing Company, Inc., 1933.

percentage for the Middle States is added, the institutions in these two regions registered over four-fifths, or 81.9 per cent, of the students; and if the figure for the Far West is included, these three regions accounted for over nine-tenths of the students. In contrast, the percentages for the remaining three regions, namely, the Southeast, Southwest, and Northwest, were 4.9, 2.6, and 2.2, respectively.

The following comparisons of Rows A, B, and C of Table 15 show that the Northeast region had 31.2 per cent of the population and 44.4 per cent of the students' homes, but 49.6 per cent of all the students attended institutions located there. The same trend, though not so striking, was found in the Middle States with 27.2 per cent of the population, 30.8 per cent of the students' homes, and 32.3 per cent of the students enrolled in institutions located therein. The Far West region had 6.7 per cent of the population and 8.8 per cent of the students' homes, but 8.4 per cent of the students attended institutions located there; the percentage of students attending institutions located in this region was slightly smaller than the percentage of students' homes, yet both of these percentages were larger than the percentage of the population who lived in the region. The Northwest region, with 5.7 per cent of the population, had 4.7 per cent of the students' homes; but only 2.2 per cent of the students attended institutions located within its borders. The Southwest had an even greater drop with 8.0 per cent of the population, 3.8 per cent of the students' homes, and only 2.6 per cent of the students enrolled in institutions in the region. And, finally, in the Southeast region were found 21.2 per cent of the population and 7.4 per cent of the students' homes; but only 4.9 per cent of the students were enrolled in institutions located there.

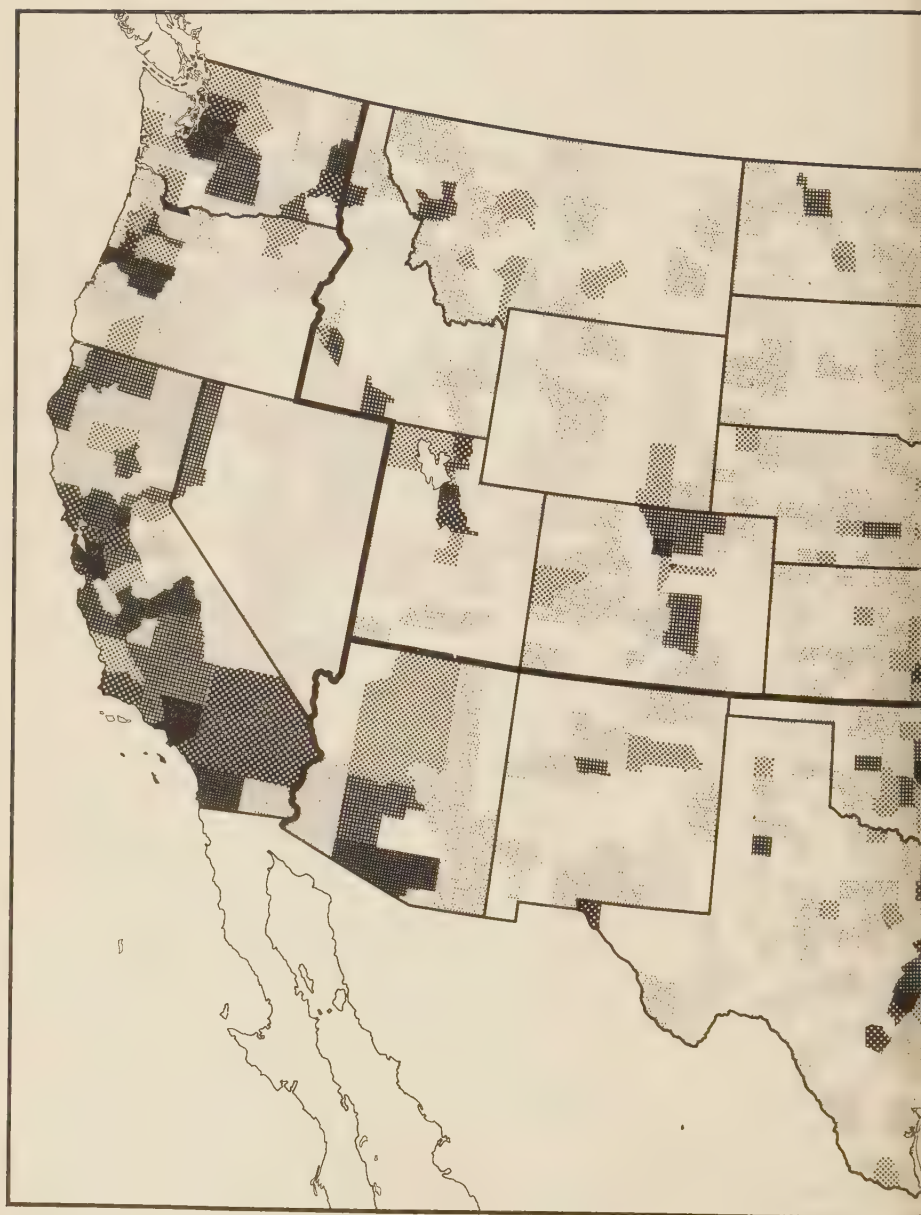
These data emphasize the fact that the institutions located in those regions which are more populous and which have a large percentage of the institutions, namely, the Northeast and Middle States regions, not only served their home regions better in that larger proportions of the local population attended graduate schools but they also gave instruction to most of the graduate students who attended institutions located outside their home regions.

Patterns Found by Classifying the Counties According to the Number of Students' Homes

The national patterns formed by classifying the counties of the United States on the basis of the number of included students who were residents of each county are shown by the map in Figure 2. In general, the lighter shades which indicate fewer students were in the Great Plains and the Old South, or--to be more exact--in the entire Southeast region, West Virginia from the Northeast region, the southern part of Missouri from the Middle States region, the Northwest region except for the eastern sections of Nebraska and Kansas, Nevada and eastern Oregon from the Far West region, and the Southwest region except for central Oklahoma and parts of eastern Texas. There were, of course, other isolated sections of light shades. The darker shades were for the most part in two groups: one group included nearly all of the Northeast and Middle States regions with a fringe on the edge of the Northwest region as well as a line through Oklahoma and Texas in the Southwest region; the second group was located along the Pacific Coast in the Far West.

The distribution of counties by regions according to the number of students who had homes in the counties appears in Table 16. Approximately two-sevenths, or 819, of the counties produced no students; and 698 of these 819 counties are located in the Southeast, Southwest, and Northwest regions. In each of these three regions over one-third of the counties furnished no students. In fact, 1,357 counties--nearly one-half of the 3,067--accounted for only 538 of the 44,326 students. Other relationships may be seen in the following tables. For example, Table 17 shows that the aggregate quota for the 819 counties which produced no students was 3,099, or approximately 4 per county. Over 1,800 of these "lost" students should have been in the Southeast while the Southwest and the Northwest combined should have accounted for another 850.

Of the 1,357 counties which had a total of only 538 students, 571 counties are in the Southeast; 313, in the Northwest; and 218, in the Southwest. In each of these three regions over half the counties were the homes of not more than one student each, and 698 of the counties in these three regions had no students residing in their borders. Yet Table 17 shows that the aggregate



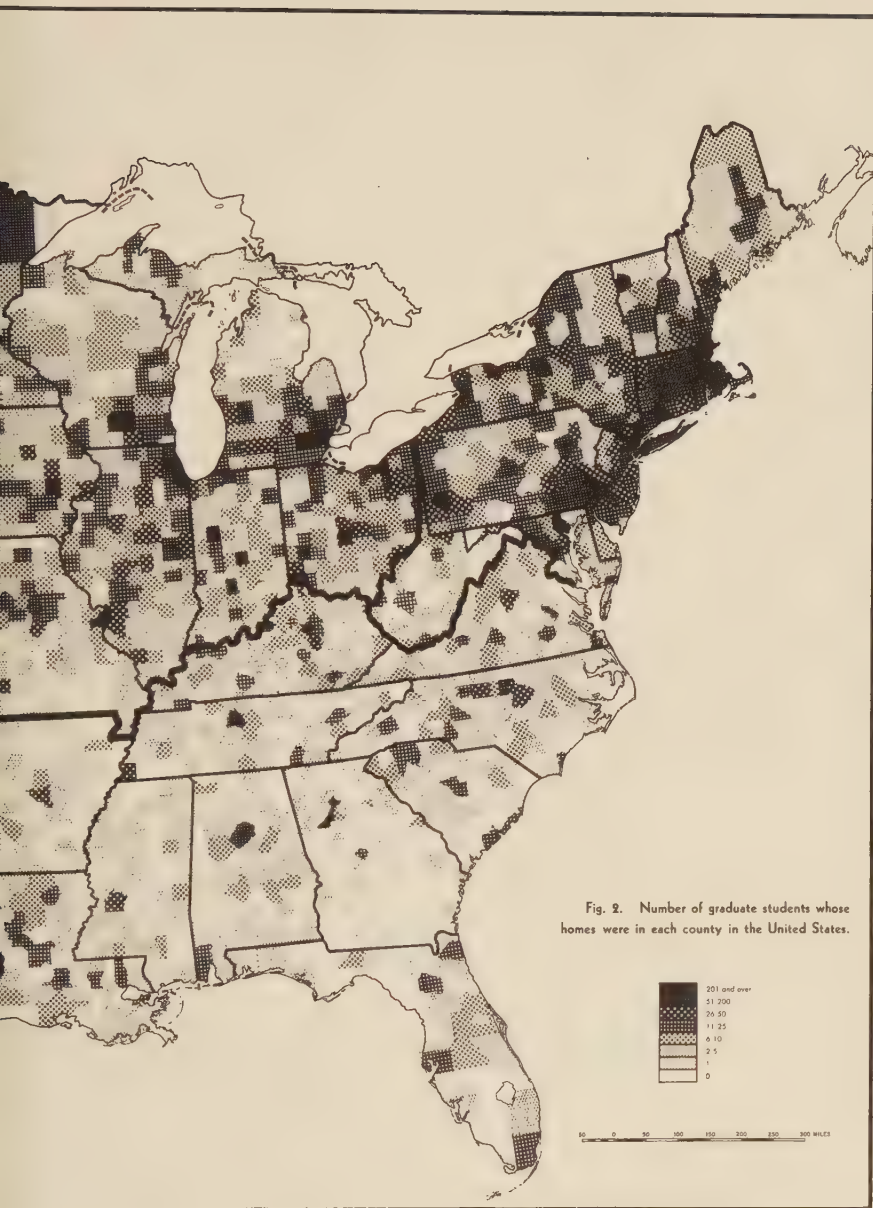


Fig. 2. Number of graduate students whose homes were in each county in the United States.

TABLE 16

REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING TO THE
NUMBER OF STUDENTS' HOMES IN EACH COUNTY

Number of Students Hav- ing Homes in the County	Number of Counties in Each Region Having Indicated Number of Students' Homes						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.....	27	66	356	136	206	28	819
1.....	19	88	215	82	107	27	538
2-5.....	60	278	263	106	153	36	896
6-10.....	55	152	83	23	33	17	363
11-25.....	61	91	38	16	26	18	250
26-50.....	28	31	10	8	5	11	93
51-200.....	30	18	9	4	5	8	74
Over 200.....	15	12	...	1	1	5	34
Total....	295	736	974	376	536	150	3,067

TABLE 17

REGIONAL DISTRIBUTION OF THE AGGREGATE QUOTAS ACCORDING TO
THE NUMBER OF STUDENTS' HOMES IN EACH COUNTY

Number of Students Having Homes in the County	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Number of Students' Homes						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.....	117.5	213.6	1,866.7	462.4	405.2	34.0	3,099.4
1.....	105.4	392.0	1,424.4	459.1	329.0	79.0	2,788.9
2-5.....	533.6	1,639.4	2,397.6	997.1	743.9	205.2	6,516.8
6-10.....	739.4	1,406.5	1,128.6	351.5	266.8	177.6	4,070.4
11-25.....	1,394.6	1,558.0	1,222.4	366.4	353.2	272.1	5,166.7
26-50.....	1,332.1	1,181.8	439.3	572.4	117.8	280.1	3,923.5
51-200...	2,934.1	1,563.6	930.4	317.6	285.4	443.2	6,474.3
Over 200.	6,656.4	4,081.0	.....	31.7	38.0	1,479.0	12,286.1
Total..	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.1

quota for these 571 counties in the Southeast region was nearly 3,300 students; for the 313 counties in the Northwest, over 700 students; and for the 218 counties in the Southwest, over 900 students. The actual numbers of students (as shown in Table 18) were 215, 107, and 82, respectively.

TABLE 18

REGIONAL DISTRIBUTION OF THE STUDENTS ACCORDING TO THE
NUMBER OF STUDENTS' HOMES IN EACH COUNTY

Number of Students Hav- ing Homes in the County	Number of Students in Each Region for Each Group of Counties Having Indicated Number of Students' Homes						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.....	.....	.....	.....	.....	.....	.....	.....
1.....	19	88	215	82	107	27	538
2-5.....	200	941	768	313	455	115	2,792
6-10.....	418	1,172	603	168	244	138	2,743
11-25.....	1,020	1,472	578	244	394	312	4,020
26-50.....	927	1,007	323	283	179	356	3,120
51-200.....	3,011	1,542	776	378	444	552	6,703
Over 200.....	14,031	7,432	.....	236	259	2,396	24,354
Total.....	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^a

^aThe fifty-six students with incomplete addresses are not included in this table.

On the other hand, in the thirty-four counties in each of which over 200 students lived there was a total of 24,354 students whereas their quotas totaled about half that number, or 12,286. The number of students from such counties in the Northeast and the Middle States regions was over 21,000; the Far West contributed 2,396, the Southeast supplied none, and the sum for the Southwest and Northwest regions was less than 500 students.

Patterns Found by Classifying the Counties Ac- cording to the Number of Students per Thousand Square Miles

The above discussion gave the distribution of the students homes by counties, but it did not consider the density of the student distribution in the various counties. In considering the density of student distribution, the number of students per thou-

sand square miles was used. This figure was used because the numbers of graduate students per square mile were in most cases fractional figures; furthermore, one thousand square miles is only slightly larger than the area of the average county, which contains 970 square miles.

The classification of the counties on the basis of the density of student distribution, as given in Figure 3, reveals that the largest concentration of density of student distribution is in the Northeast and Middle States regions while there is a smaller concentration along the Pacific Coast of the Far West region.

A comparison of Figure 3 with Figure 2 shows that the areas in which there are smaller counties, namely, the section east of the Mississippi River, are darker in the former figure whereas those areas with larger counties tend to have lighter shades; on the whole, the counties of the Northeast and the Middle States regions are darker in shade than are the counties in the Southeast region. In the Southwest region the counties of central Oklahoma and eastern Texas have darker shades in Figure 3, but the remainder of the counties tend to have lighter shades. In the Northwest region many of the counties in eastern Kansas and eastern Nebraska have darker shades; but with a few exceptions such as Denver County, Colorado, the counties in the rest of the region have lighter shades. A majority of the counties in the Far West region have lighter shades in Figure 3; for several counties the shades are the same; and in a few cases, for example, Multnomah County, Oregon, the shades are darker in Figure 3.

Nearly one-third, or 973, of the counties had less than one student per thousand square miles; and over 800 of these counties are located in the Southeast, Southwest, and Northwest regions (see Table 19). Furthermore, with the exception of the Northeast and Middle States regions more than one-third of the counties in each region produced fewer than one student per thousand square miles. The aggregate quota for these counties, as shown in Table 20, was 3,759 students; but only 223 students had homes located in them.

In contrast, the 61 counties which had 201 or more students per thousand square miles had an aggregate quota of 14,122 students but actually produced nearly twice that number, or 26,884. Forty-three of these counties are located in the Northeast and Middle States regions; the aggregate quota for these 43 counties was

TABLE 19

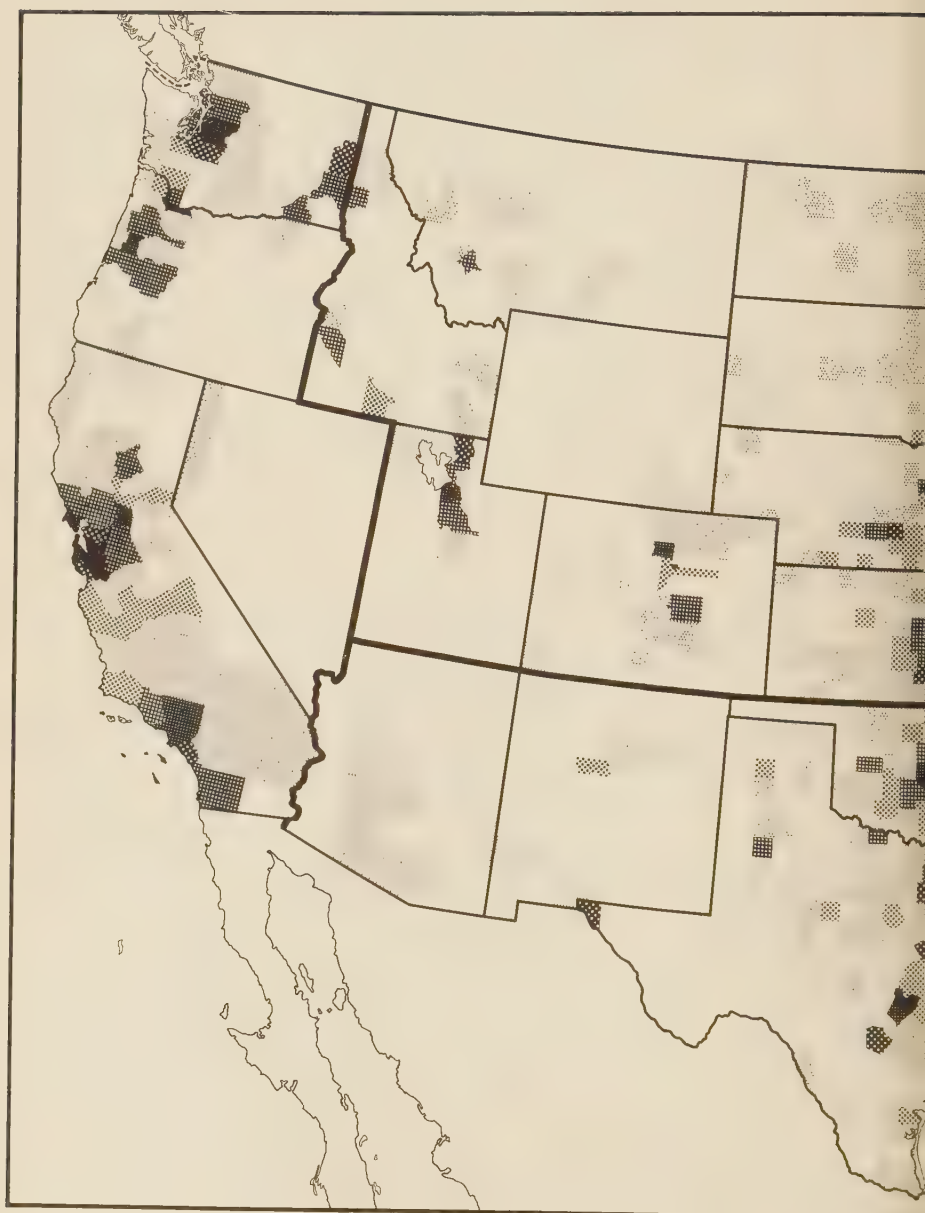
REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING TO THE
NUMBER OF STUDENTS PER THOUSAND SQUARE MILES

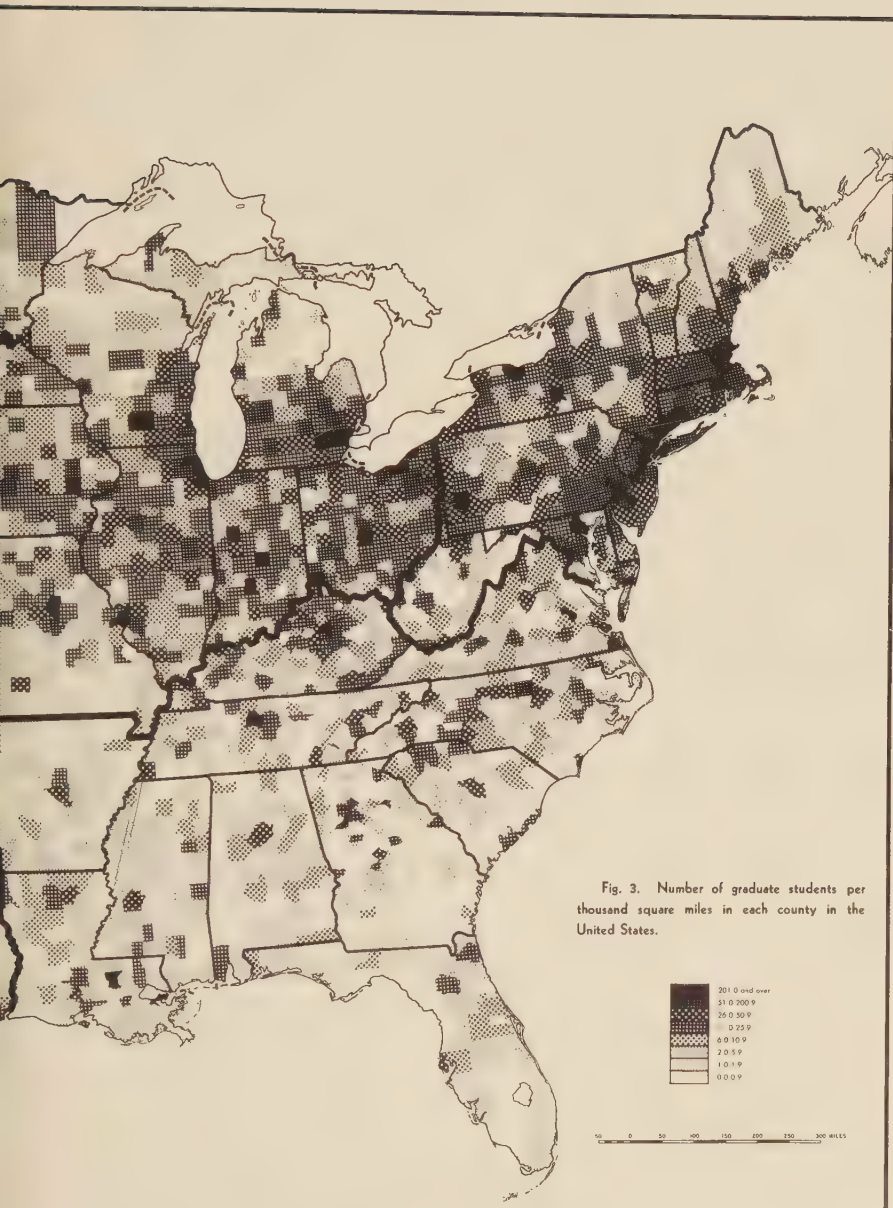
Number of Students per Thousand Square Miles in Each County	Number of Counties in Each Region Having Indicated Number of Students per Thousand Square Miles						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.0-0.9.....	29	75	357	169	282	61	973
1.0-1.9.....	11	49	114	74	72	13	333
2.0-5.9.....	43	168	237	77	91	34	650
6.0-10.9.....	38	147	124	28	48	8	393
11.0-25.9.....	64	186	89	15	29	19	402
26.0-50.9....	42	59	31	7	5	5	149
51.0-200.9...	41	36	15	4	5	5	106
201.0 and over	27	16	7	2	4	5	61
Total.....	295	736	974	376	536	150	3,067

TABLE 20

REGIONAL DISTRIBUTION OF THE AGGREGATE QUOTAS WITH THE
COUNTIES GROUPED ACCORDING TO THE NUMBER OF
STUDENTS PER THOUSAND SQUARE MILES

Number of Students per Thousand Square Miles in Each County	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Number of Students per Thousand Square Miles						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.0-0.9..	128.7	253.0	1,872.6	645.5	680.6	178.6	3,759.0
1.0-1.9..	107.7	223.1	952.8	499.4	266.2	65.4	2,114.6
2.0-5.9..	364.9	975.7	1,979.8	806.1	491.7	373.2	4,991.4
6.0-10.9.	490.0	975.3	1,295.3	395.7	307.3	138.9	3,602.5
11.0-25.9	1,070.7	1,874.4	1,166.3	272.8	276.1	326.4	4,986.7
26.0-50.9	1,264.2	1,220.9	1,093.0	521.1	105.1	187.0	4,391.3
51.0-200.9	2,369.0	1,950.4	561.3	376.7	172.9	927.6	6,358.2
201.0 and over...	8,017.9	4,563.1	488.0	40.9	239.4	773.1	14,122.4
Total..	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.1





12,581 of the 14,122, and they produced 23,452 of the 26,884 students. Over half of the remaining 3,432 students were from the Far West region.

Table 22 gives the student-quota ratios which were found by dividing each figure in Table 21 by the corresponding figure in Table 20, then multiplying the quotients by a constant in order that the ratios would express the number of students per 100 expected students. It can be seen that the ratios tended to increase as the density of the student distribution increased.

TABLE 21

REGIONAL DISTRIBUTION OF THE STUDENTS WITH THE COUNTIES
GROUPED ACCORDING TO THE NUMBER OF STUDENTS
PER THOUSAND SQUARE MILES

Number of Students per Thousand Square Miles in Each County	Number of Students in Each Region for Each Group of Counties Having Indicated Number of Students per Thousand Square Miles						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.0-0.9.....	4	10	1	57	104	47	223
1.0-1.9.....	28	55	123	106	138	39	489
2.0-5.9.....	133	424	447	296	315	309	1,924
6.0-10.9.....	243	694	521	186	278	142	2,064
11.0-25.9....	665	1,664	609	191	366	464	3,959
26.0-50.9....	882	1,172	547	234	86	198	3,119
51.0-200.9...	2,226	1,673	399	283	249	778	5,608
201.0 and over	15,490	7,962	616	351	546	1,919	26,884
Total.....	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^a

^aThis number does not include the fifty-six students with incomplete addresses.

TABLE 22

REGIONAL DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE
COUNTIES GROUPED ACCORDING TO THE NUMBER OF STUDENTS
PER THOUSAND SQUARE MILES^a

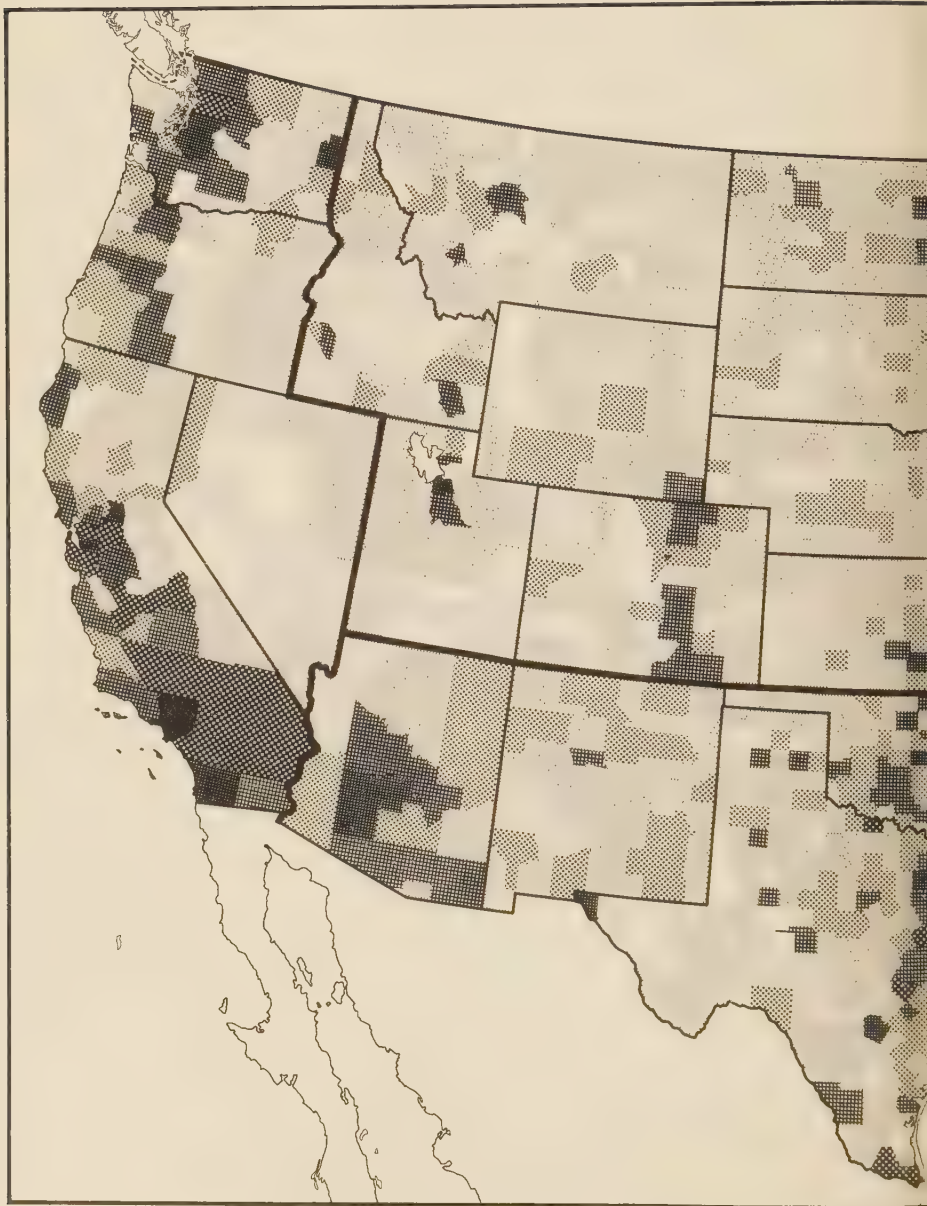
Number of Students per Thousand Square Miles in Each County	Student-Quota Ratio in Each Region for Each Group of Counties Having Indicated Number of Students per Thousand Square Miles						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.0-0.9.....	3	4	00	9	15	26	6
1.0-1.9.....	26	25	13	21	52	60	23
2.0-5.9.....	36	43	23	37	64	83	39
6.0-10.9.....	50	71	40	47	90	102	57
11.0-25.9....	62	89	52	70	133	142	79
26.0-50.9....	70	96	50	45	82	106	71
51.0-200.9...	94	86	71	75	144	84	88
201.0 and over	193	174	126	858	228	248	190
All counties.	142	113	35	48	82	131	100

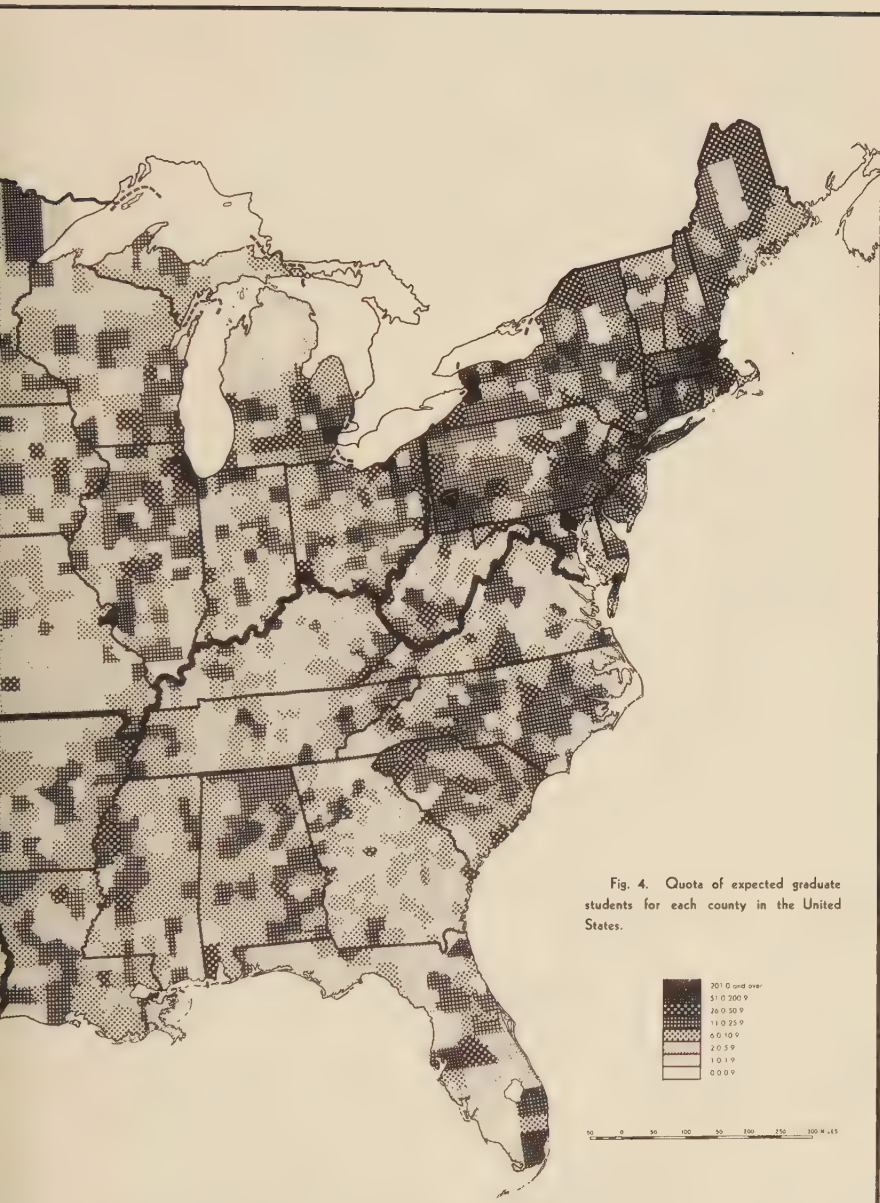
^aThe entries in this table give the number of students per 100 expected graduate students.

Patterns Found by Classifying the Counties
According to Their Quotas of Ex-
pected Graduate Students

Figure 4, which gives the national patterns by counties of the distribution of the quotas, shows that although the population was not evenly distributed throughout the nation, it was more evenly distributed than were the students' homes, as revealed in Figure 2. As in that figure, however, the shades tend to be darker in the Northeast and Middle States regions. The Far West region also has darker shades, particularly in the Pacific Coast states. In general, light shades are found in the area lying between the Pacific Coast states and the first column of states west of the Mississippi, namely, Minnesota, Iowa, Missouri, Arkansas, and Louisiana. There is a dark fringe starting in eastern Nebraska and extending southward through eastern Texas, and there are also other spots of dark shades. The whole area, however, is light in tone. The general tone of the Southeast region is much darker in this map than in the map of Figure 2.

This material was also studied in tables which give the patterns of the counties, the students, and the quotas. Table 23





gives the distribution of the counties. Inasmuch as the quotas are proportional to the population, a comparison of Table 23 with Table 16 likewise shows that the population was more evenly distributed throughout the United States than were the students; for example, there were fewer counties at either extreme--counties which had very small populations or very large ones. Furthermore, for each region the population was more evenly distributed than were the homes of the students. This trend was very marked in the Southeast region, for the counties of this region did not have nearly so many students as the population indicated they should have had. For the Southwest and Northwest regions there are also marked differences in the figures of the two tables.

TABLE 23
REGIONAL DISTRIBUTION OF THE COUNTIES
ACCORDING TO THEIR QUOTAS

Quota for the County (1)	Row (2)	Number of Counties in Each Region Having Indicated Quotas						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
0.0-0.9...	A	...	6	...	20	55	15	96
1.0-1.9...	B	8	21	56	33	97	22	237
2.0-5.9...	C	53	326	400	151	279	46	1,255
6.0-10.9..	D	63	210	304	90	77	24	768
11.0-25.9.	E	88	107	168	65	21	24	473
26.0-50.9.	F	32	39	28	8	2	10	119
51.0-200.9	G	41	21	18	9	5	7	101
201.0 and over....	H	10	6	...	...	...	2	18
Total...	I	295	736	974	376	536	150	3,067

In Table 24 is given the distribution of the expected graduate students who were residing in various groups of counties. The regions with relatively populous areas had large portions of their quotas in Rows G and H, yet Table 23 shows there were relatively few counties in these two rows. This indication of concentration of the population was very noticeable in the Northeast, Middle States, and Far West regions; in contrast, the Northwest region had a relatively small portion of its aggregate quota con-

centrated in such counties.

TABLE 24

REGIONAL DISTRIBUTION OF THE AGGREGATE QUOTAS WITH THE
COUNTIES CLASSIFIED ACCORDING TO THEIR QUOTAS

Quota for the County	Row	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Quotas						
		North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0.0- 0.9	A	.....	4.3	.....	11.7	31.6	8.9	56.5
1.0- 1.9	B	11.7	32.4	86.8	49.4	141.1	30.1	351.5
2.0- 5.9	C	224.7	1,360.7	1,571.8	592.7	986.7	172.5	4,909.1
6.0- 10.9	D	532.3	1,638.8	2,491.6	724.4	602.1	198.3	6,187.5
11.0- 25.9	E	1,540.1	1,690.4	2,600.5	1,006.2	337.0	425.1	7,599.3
26.0- 50.9	F	1,189.5	1,335.6	959.2	263.5	68.8	355.1	4,171.7
51.0- 200.9	G	3,993.3	2,134.0	1,699.5	910.3	372.0	689.0	9,798.1
201.0 and over	H	6,321.5	3,839.7	.....	.....	.....	1,091.2	11,252.4
Total..	I	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.1

Interesting comparisons may be made between Table 24 and Table 25 because the homes of the students were more concentrated among the populous counties than were the quotas or the population. For example, in the Northeast region the number of students in Row H is nearly as large as the quota for the entire region.

Column 9 of Table 26 indicates a definite trend toward larger student-quota ratios among the counties with larger quotas, which are, of course, the more populous counties. Within the regions there were numerous variations, but in each case the same trend was noticeable in spite of the many fluctuations. Informative comparisons may be made between Tables 22 and 26.

The small ratio for the Far West in Row H of Table 26 may be partially explained by the fact that it was impossible to obtain a complete list of the students of the University of Southern

TABLE 25

REGIONAL DISTRIBUTION OF THE STUDENTS WITH THE COUNTIES
CLASSIFIED ACCORDING TO THEIR QUOTAS

Quota for the County (1)	Row (2)	Number of Students in Each Region for Each Group of Counties Having Indicated Quotas						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
0.0-0.9.....	A	.....	2	.....	.....	12	3	17
1.0-1.9.....	B	11	16	15	15	30	16	103
2.0-5.9.....	C	117	970	522	161	501	116	2,387
6.0-10.9.....	D	309	1,502	663	339	623	269	3,705
11.0-25.9.....	E	1,537	2,407	875	407	285	387	5,898
26.0-50.9.....	F	829	1,306	493	337	298	654	3,917
51.0-200.9....	G	4,546	2,365	695	445	333	1,489	9,873
201.0 and over	H	12,322	5,086	.....	.....	.....	962	18,370
Total.....	I	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^a

^aThe fifty-six students with incomplete addresses are not included in this table.

TABLE 26

REGIONAL DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH
THE COUNTIES CLASSIFIED ACCORDING TO THEIR QUOTAS

Quota for the County (1)	Row (2)	Student-Quota Ratio in Each Region for Each Group of Counties Having Indicated Quotas ^a						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
0.0-0.9.....	A	...	47	...	0	38	34	30
1.0-1.9.....	B	94	49	17	30	21	53	29
2.0-5.9.....	C	52	71	33	27	51	67	49
6.0-10.9.....	D	58	92	27	47	103	136	60
11.0-25.9.....	E	100	142	34	40	85	91	78
26.0-50.9.....	F	70	98	51	128	433	184	94
51.0-200.9....	G	114	111	41	49	90	216	101
201.0 and over	H	195	132	...	...	...	88	163
All counties..	I	142	113	35	48	82	131	100

^aThe entries in this table give the number of students per 100 expected graduate students.

California. The large ratios in certain categories of the Southwest and the Northwest illustrate the influence exerted by certain publicly controlled¹ institutions which are located in sparsely populated counties.

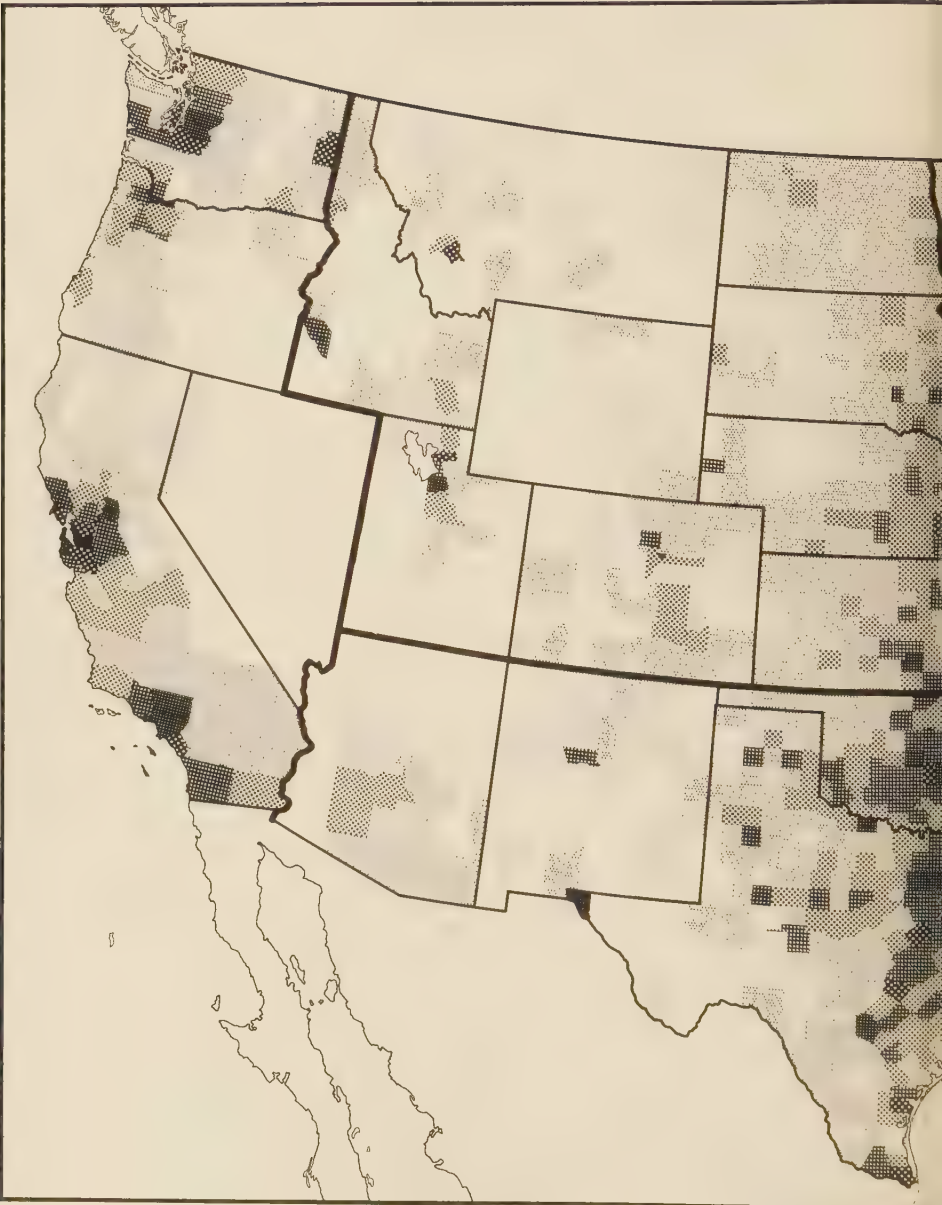
Patterns Found by Classifying the Counties According to Their Quotas of Expected Graduate Students per Thousand Square Miles

The national pattern of the quotas of graduate students per thousand square miles for each county is presented in Figure 5. Since this pattern is proportional to the density of the population, the darker shades are found in the eastern part of the United States, namely, the Northeast, Middle States, and Southeast regions. A fringe of the darker shades extends into the Southwest region in eastern Texas and central Oklahoma and into the Northwest region in the eastern parts of Kansas and Nebraska as well as southeastern South Dakota. In addition, there are several islands of darker shades along the Pacific Coast as well as a few small areas in the Rocky Mountain section, but with these exceptions the counties in the Southwest, Northwest, and Far West regions have very light shades.

A comparison of Figures 4 and 5 shows that in general the counties in the Northeast, Middle States, and Southeast regions have darker shades in the latter figure whereas the counties in the remaining three regions have lighter shades. There are, of course, exceptions as in the eastern part of the Southwest region and the southeastern part of the Northwest region.

Of the 375 counties with quotas of less than 2 graduate students per thousand square miles, 356 are located in the Southwest, Northwest, and Far West regions with 211 of them located in the Northwest (see Table 27). On the other hand, of the 60 counties with quotas of more than 200 graduate students per thousand square miles, the Northwest and Far West regions have only 3 each

¹The terms "publicly controlled" and "privately controlled" are used in this study for convenience in distinguishing the institutions controlled and largely supported by the state government or its electorate from the institutions whose governing boards are neither appointed by nor responsible to the state government or its electorate and whose support comes largely from gifts, endowments, tuition, and income derived from gifts and endowments. In a larger sense, both types serve the public and, hence, are public institutions--neither type could be called proprietary.



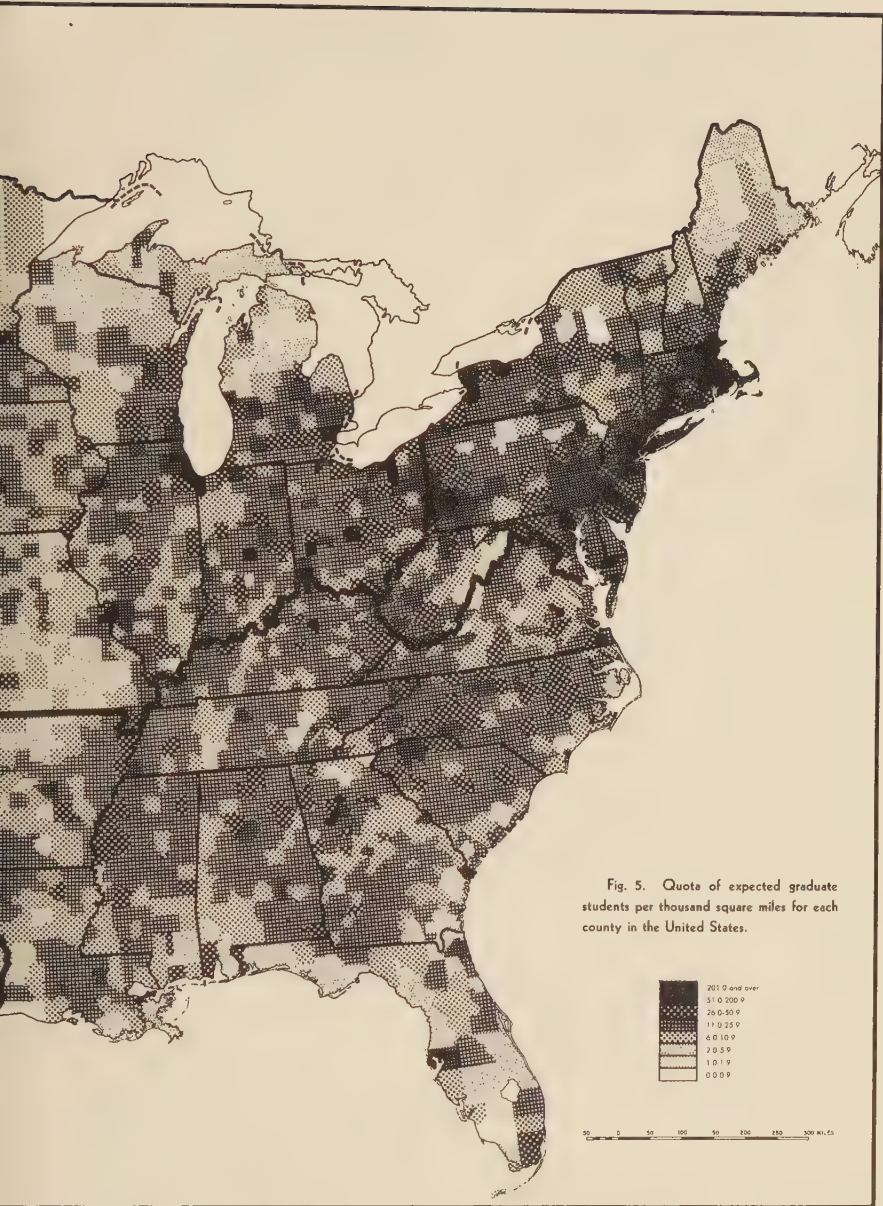


Fig. 5. Quota of expected graduate students per thousand square miles for each county in the United States.

TABLE 27

REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING
TO THEIR QUOTAS PER THOUSAND SQUARE MILES

Quota of Expected Graduate Students per Thousand Square Miles	Number of Counties in Each Region Having Indicated Quotas per Thousand Square Miles						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.0-0.9.....	1	3	1	44	117	35	201
1.0-1.9.....	1	9	4	37	94	29	174
2.0-5.9.....	17	89	89	103	194	38	530
6.0-10.9.....	40	267	246	94	82	21	750
11.0-25.9.....	104	245	497	79	37	13	975
26.0-50.9.....	48	65	93	8	6	7	227
51.0-200.9.....	53	43	36	11	3	4	150
201.0 and over..	31	15	8	...	3	3	60
Total.....	295	736	974	376	536	150	3,067

and the Southwest has none.

In Tables 28 and 29 are given the distributions of the aggregate quotas and of the number of students, and Table 30 gives the student-quota ratios based upon the figures of Tables 28 and 29. The number of students per 100 expected graduate students tended to increase with the density of the population of the counties, as shown in Column 9 of Table 30; the unusually large ratio for Row F shows the effect of large publicly controlled universities located in counties with relatively small populations.

Patterns Found by Classifying the Counties
According to Their Student-Quota Ratios

A student-quota ratio of 200 indicates that a county produced 200 graduate students for each 100 expected graduate students, or twice as many as were expected from its population according to the national average. As shown on page 12, the national average was one graduate student for every 467 persons aged twenty to twenty-nine; hence a county with a population of 467 which sent two students to graduate schools had a ratio of 200. Figure 6 shows the counties classified according to these ratios.

The light and dark areas in Figure 6 correspond fairly

TABLE 28

REGIONAL DISTRIBUTION OF THE AGGREGATE QUOTAS WITH THE
COUNTIES CLASSIFIED ACCORDING TO THEIR QUOTAS
PER THOUSAND SQUARE MILES

Quota of Expected Graduate Students per Thousand Square Miles	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Quotas per Thousand Square Miles						
	North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
0.0-0.9..	1.2	2.3	1.4	89.6	173.3	57.2	320.5
1.0-1.9..	5.2	14.6	6.8	130.3	223.5	110.2	490.6
2.0-5.9..	98.0	302.8	273.8	443.2	779.3	364.3	2,261.4
6.0-10.9.	314.4	1,416.5	1,130.2	702.2	515.1	271.5	4,349.9
11.0-25.9	1,094.8	2,091.0	3,983.7	1,028.0	318.7	291.0	8,807.2
26.0-50.9	1,005.9	1,299.5	1,621.8	212.0	126.6	251.8	4,517.6
51.0-200.9	2,663.3	1,778.8	1,653.6	952.9	159.4	1,071.3	8,279.3
201.0 and over...	8,630.3	5,130.4	738.1	.....	243.4	557.4	15,299.6
Total..	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.1

TABLE 29

REGIONAL DISTRIBUTION OF THE STUDENTS WITH THE COUNTIES
CLASSIFIED ACCORDING TO THEIR QUOTAS
PER THOUSAND SQUARE MILES

Quota of Expected Graduate Students per Thousand Square Miles	Number of Students in Each Region for Each Group of Counties Having Indicated Quotas per Thousand Square Miles						
	North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
0.0-0.9.....	2	0	0	22	41	18	83
1.0-1.9.....	3	5	1	41	83	90	223
2.0-5.9.....	33	151	48	135	363	361	1,091
6.0-10.9.....	182	1,127	257	235	469	283	2,553
11.0-25.9.....	803	2,316	1,191	493	436	294	5,533
26.0-50.9.....	1,069	1,969	496	321	318	527	4,700
51.0-200.9.....	2,014	1,203	399	457	159	1,212	5,944
201.0 and over	15,565	6,883	371	.....	213	1,111	24,143
Total.....	19,671	13,654	3,263	1,704	2,082	3,896	44,273 ^a

^aThis total does not include the fifty-six students who had incomplete addresses.

TABLE 30

REGIONAL DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE
COUNTIES CLASSIFIED ACCORDING TO THEIR QUOTAS
PER THOUSAND SQUARE MILES

Quota of Ex- pected Gradu- ate Students per Thousand Square Miles (1)	Row (2)	Student-Quota Ratio in Each Region for Each Group of Counties with the Indicated Quotas per Thousand Square Miles ^a						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
0.0-0.9.....	A	167	0	0	25	24	34	26
1.0-1.9.....	B	58	34	15	31	37	82	45
2.0-5.9.....	C	34	50	18	30	47	99	48
6.0-10.9.....	D	82	80	23	33	91	104	59
11.0-25.9.....	E	73	111	30	48	137	101	63
26.0-50.9.....	F	106	152	31	151	251	209	104
51.0-200.9....	G	76	68	54	48	100	113	71
201.0 and over	H	180	134	50	...	88	199	158
All counties..	I	142	113	35	48	82	131	100

^aThe entries in this table give the number of students per 100 expected graduate students.

well with those in Figure 2. It will be noted that there was a tendency for the extremely high ratios to be grouped in relatively small clusters of counties. Except in the Southeast region the higher ratios were generally found in populous areas which are relatively near one or more graduate institutions; but sparsely populated counties in which institutions are located tended to have the highest ratios. The counties which had the smaller ratios tended to be areas which were less populous, which are more remote from institutions, and which had lower socio-economic indices.

Table 31 gives the regional distribution of the counties classified on a basis of the student-quota ratios. The 819 counties with ratios of zero form the largest single category in Column 9; and, as shown in Table 16 (see p. 48), 698 of these counties are located in the Southeast, Southwest, and Northwest regions.

Of the 3,067 counties in the United States, 1,903--62 per cent--had ratios of 50 or less; that is, they sent less than half as many graduate students as the national average indicated they should have sent. Of these 1,903 counties, 803 are in the Southeast; 306, in the Southwest; 339, in the Northwest; and 278, in

TABLE 31

REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING
TO THEIR STUDENT-QUOTA RATIOS

Student-Quota Ratio for the County ^a	Row	Number of Counties in Each Region Having Indicated Student-Quota Ratios						
		North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0.....	A	27	66	356	136	206	28	819
1-25.....	B	28	53	248	84	31	8	452
26-50.....	C	62	159	199	86	102	24	632
51-75.....	D	56	161	78	36	69	22	422
76-100.....	E	45	109	39	16	55	19	283
101-250.....	F	67	168	48	15	65	41	404
251-500.....	G	7	12	4	...	5	6	34
501 and over	H	3	8	2	3	3	2	21
Total....	I	295	736	974	376	536	150	3,067

^aThe entries in this column indicate the number of students per 100 expected graduate students.

the Middle States. While this category includes 82 per cent of the counties in the Southeast, 81 per cent of those in the Southwest, and 63 per cent of those in the Northwest, it includes only 40 per cent of those in the Northeast and only 38 per cent of those in the Middle States. In contrast, there were 55 of the 3,067 counties which had ratios larger than 250. Of these, 10 are located in the Northeast; 20, in the Middle States; 6, in the Southeast; 3, in the Southwest; 8, in the Northwest; and 8, in the Far West.

These county figures would be of more value if the size of the quotas and the number of students involved were known. Table 32 gives the distribution of the quotas for the various categories. Based on this distribution, 3,099 students should have resided in the 819 counties which had ratios of zero; of these, 1,867 should have come from the Southeast region. Furthermore, there should have been 16,653 students in the 1,903 counties with ratios of 50 or less; in the Southeast region 7,842 of its aggregate quota of 9,409 students should have resided in such counties; in the Southwest region, 2,790 of 3,558; and in the Northwest region, 1,119 of 2,539.



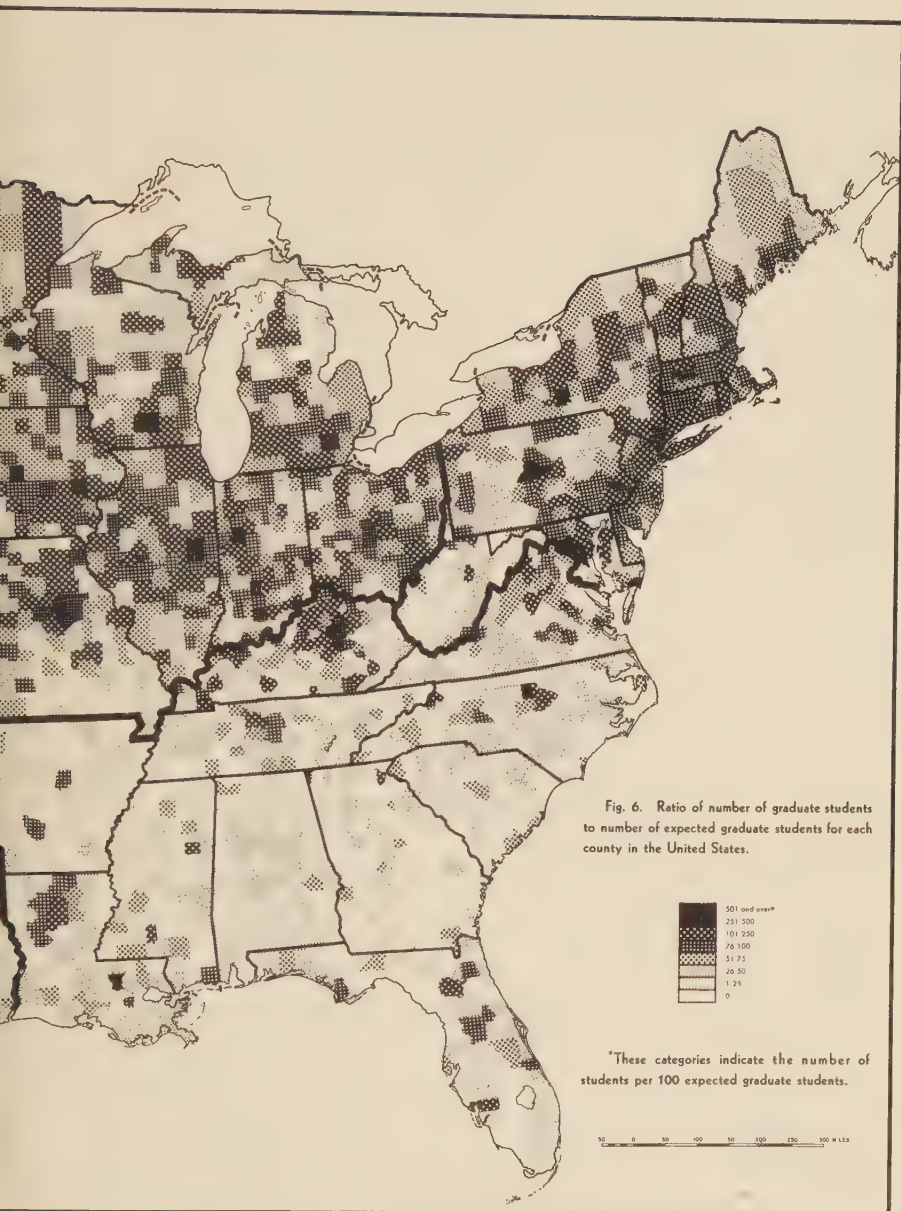


TABLE 32

REGIONAL DISTRIBUTION OF THE AGGREGATE QUOTAS WITH
THE COUNTIES CLASSIFIED ACCORDING TO
THEIR STUDENT-QUOTA RATIOS

Student- Quota Ratio for the County ^a	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Student-Quota Ratios						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.....	117.5	213.6	1,866.7	462.4	405.2	34.0	3,099.4
1-25....	433.8	430.7	3,050.1	925.9	182.2	71.4	5,094.2
26-50...	1,442.0	1,994.4	2,924.7	1,401.4	531.4	165.9	8,459.8
51-75...	1,918.8	3,245.9	720.9	357.9	441.4	1,006.8	7,691.7
76-100..	1,954.2	1,300.9	368.3	121.1	335.8	380.0	4,460.3
101-250.	4,400.9	4,310.7	396.9	243.3	563.2	878.1	10,793.1
251-500.	3,501.5	387.7	49.7	.....	22.9	379.2	4,341.0
501 and over..	44.4	152.0	32.1	46.2	57.2	54.8	386.7
Total.	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.1

^aThe entries in this column indicate the number of students per 100 expected graduate students.

Table 33 shows that for the nation as a whole those counties with ratios of 50 or less had smaller average quotas which indicated that they were less populous than the counties with higher ratios; it also shows on a regional basis that with the exception of the Southeast region the counties in each region with ratios of 50 or less tended to be less populous than the remaining counties in that region. This trend was conspicuous in the Northeast and the Far West regions.

The aggregate quota of expected graduate students for the fifty-five counties with ratios of more than 250 was 4,728. Of these, 3,546 should have been in the Northeast; 540, in the Middle States; and 434, in the Far West. For the remaining three regions the quotas were 82 for the Southeast, 46 for the Southwest, and 80 for the Northwest. In each region the average quota for these counties was larger than the average for the entire region.

Of the fifty-five counties, thirty-two are counties in which one or more of the eighty-eight institutions included in the study are located, and in addition a branch of the University of

TABLE 33

AVERAGE QUOTA IN EACH REGION FOR THE GROUPS OF COUNTIES
WITH SELECTED STUDENT-QUOTA RATIOS

Student-Quota Ratio for the County ^a	Average Quota in Each Region for the Groups of Counties with Indicated Student-Quota Ratios						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0-50.....	17.0	9.5	9.8	9.1	3.3	4.5	8.8
51-250.....	49.2	20.2	9.0	10.8	7.1	27.6	20.7
251 and over.	354.6	27.0	13.6	15.4	10.0	54.5	86.0
All counties.	46.8	16.4	9.3	9.5	4.7	19.8	14.5

^aThe entries in this column represent the number of students per 100 expected graduate students.

California is located in one of the remaining twenty-three. Of these institutional home counties the Northeast region has institutions in seven of the ten counties; the Middle States, in ten of the twenty counties; the Southeast, in three of the six counties; the Southwest, in two of the three counties; the Northwest, in four of the eight counties; and the Far West, in six of the eight with a branch located in one of the remaining two counties.

As shown in Table 34, no students lived in the counties with ratios of zero even though these counties had an aggregate quota of 3,099 students. Only 4,028 students came from counties with ratios of 50 or less even though for these counties the aggregate quota was four times that large, namely, 16,653. In some of the regions the variations were more marked--in the Southeast region there were 1,523 students coming from counties with ratios of 50 or less, but their aggregate quota was 7,842; in the Southwest there were 684 in comparison with a quota of 2,790; and in the Northwest there were 240 in comparison with a quota of 1,119.

The fifty-five counties with ratios above 250 had 16,041 students although their aggregate quota was only 4,728. Of their students, 10,279 lived in the Northeast region; 2,887, in the Middle States; 1,595, in the Far West; and 379, 386, and 515, in the Southeast, Southwest, and Northwest regions, respectively.

TABLE 34

REGIONAL DISTRIBUTION OF THE STUDENTS WITH
THE COUNTIES CLASSIFIED ACCORDING TO
THEIR STUDENT-QUOTA RATIOS

Student- Quota Ratio for the County ^a	Number of Students in Each Region for Each Group of Counties Having Indicated Student-Quota Ratios						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
0.....	.....	.....	.....	.....	.....	.....	.....
1-25.....	85	73	472	149	36	12	827
26-50.....	553	800	1,051	535	204	58	3,201
51-75.....	1,184	2,017	441	218	279	705	4,844
76-100.....	1,611	1,149	322	106	298	352	3,838
101-250.....	5,959	6,728	598	310	750	1,174	15,519
251-500.....	9,974	1,249	177	.....	85	1,252	12,737
501 and over	305	1,638	202	386	430	343	3,304
Total....	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^b

^aThe entries in this column represent the number of students per 100 expected graduate students.

^bThe fifty-six students with incomplete addresses are not included in this table.

Measuring the Availability of Selected Institu-
tions to the Population of Various
Areas of the United States

The data in chapter 11 revealed that graduate institutions tend to be surprisingly local in their spheres of influence and that distance is a serious handicap to their prospective students; it therefore appeared worth while to examine the relationship of student-attendance to the distance which the student needed to travel in order to attend an institution giving instruction in the desired field at the doctorate level. It was impractical to attempt to find how far each individual student needed to travel, but it did appear desirable to develop an index of graduate-school availability for each county in the United States. These indices were to be inversely related to the distances from the institutions--that is, a near-by institution offering the desired work was of more value to the prospective graduate student than one remote institution or of as much value as several remote ones. Only

the fifty-five institutions which were selected on a basis of the number of fields in which they offered work on the doctorate level were used in this phase of the study, for a propinquent institution which offered work in only one or in a very few fields, if included, would have tended to affect the indices more than its true value to the population of that area. Inversely, it appeared that those institutions which offered work in a larger variety of fields were in a better position to serve the youth of their constituencies. It was obvious that many of the youth could not attend neighboring institutions which offered work on the desired level in one or only a few fields.

Since the index of graduate-school availability for each county would be the sum of fifty-five individual institutional indices of availability to the population of that county, it was necessary to determine institutional indices for the various zones. The sizes of the institutional indices were determined by dividing the sums of the students who were attending the fifty-five selected institutions and whose homes were located in various zones by the sums of the population residing in those respective zones and multiplying the quotient by 100,000; namely, $(\sum \text{students} \times 100,000) \div \sum \text{population}$. Each quotient was then divided by the smallest--0.6657--and the resulting figures were rounded to the nearest whole numbers to facilitate the additions which were necessary to find the index of graduate-school availability for each of the 3,067 counties.

The institutional indices given in Column 6 of Table 35 can be translated thus: to the population of a county an institution located in that county is worth 288 institutions located in counties over 500 miles away; an institution located in a county within 25 miles is 100 times as valuable or accessible to an individual as one over 500 miles away; and an institution located 26-50 miles away is 43 times as valuable as one over 500 miles away. One can read on down the column through an index of 18 for institutions located 51-100 miles away, an index of 6 for those located 101-250 miles away, an index of 2 for those 251-500 miles away, and an index of 1 for institutions over 500 miles distant.

The sum of the fifty-five individual institutional indices of availability to each particular county was then figured for each of the 3,067 counties, and the counties were distributed according to their respective indices. All counties in which one

TABLE 35

CALCULATIONS BASED ON THE FIFTY-FIVE SELECTED INSTITUTIONS
WHICH WERE USED IN DETERMINING THE AVAILABILITY OF
AN INSTITUTION TO THE POPULATION OF A COUNTY

Zones	Sum of Students	Sum of the Populations	100,000 x	Column 4 0.6657	Institutional Indices of Availability
			Column 2 Column 3		
(1)	(2)	(3)	(4)	(5)	(6)
Home county	18,527	9,655,861	191.9	288.2	288
1-25.....	3,076	4,609,298	66.74	100.2	100
26-50.....	3,179	11,031,017	28.82	43.29	43
51-100.....	2,914	23,726,672	12.28	18.45	18
101-250....	4,595	118,836,546	3.867	5.809	6
251-500....	3,358	226,305,050	1.484	2.229	2
501-1,000..	3,173	379,507,633	0.8361	1.256	1
Over 1,000.	2,430	365,047,153	0.6657	1.000	1

or more institutions are located were placed in one group which was indicated as the "home county" group; the minimum index any one of these counties could have was 342, because even though the other 54 institutions were located over 500 miles away from the county its index would be 288 plus 54. Two of these counties have three each of the fifty-five institutions located within their boundaries, and each of four other counties has two institutions located therein. For this phase of the study all forty-seven counties in which one or more of the fifty-five institutions are located were studied in a separate group in order to determine whether or not the presence of one or more institutions influenced other factors. Each additional county which had an index equivalent to having at least one institution located in the county had an index falling between 342 and 656, inclusive, and was marked thus. The "home county" group and the 342-656 group are really subdivisions of one category, namely, counties with indices equivalent to having at least one institution located in the county.

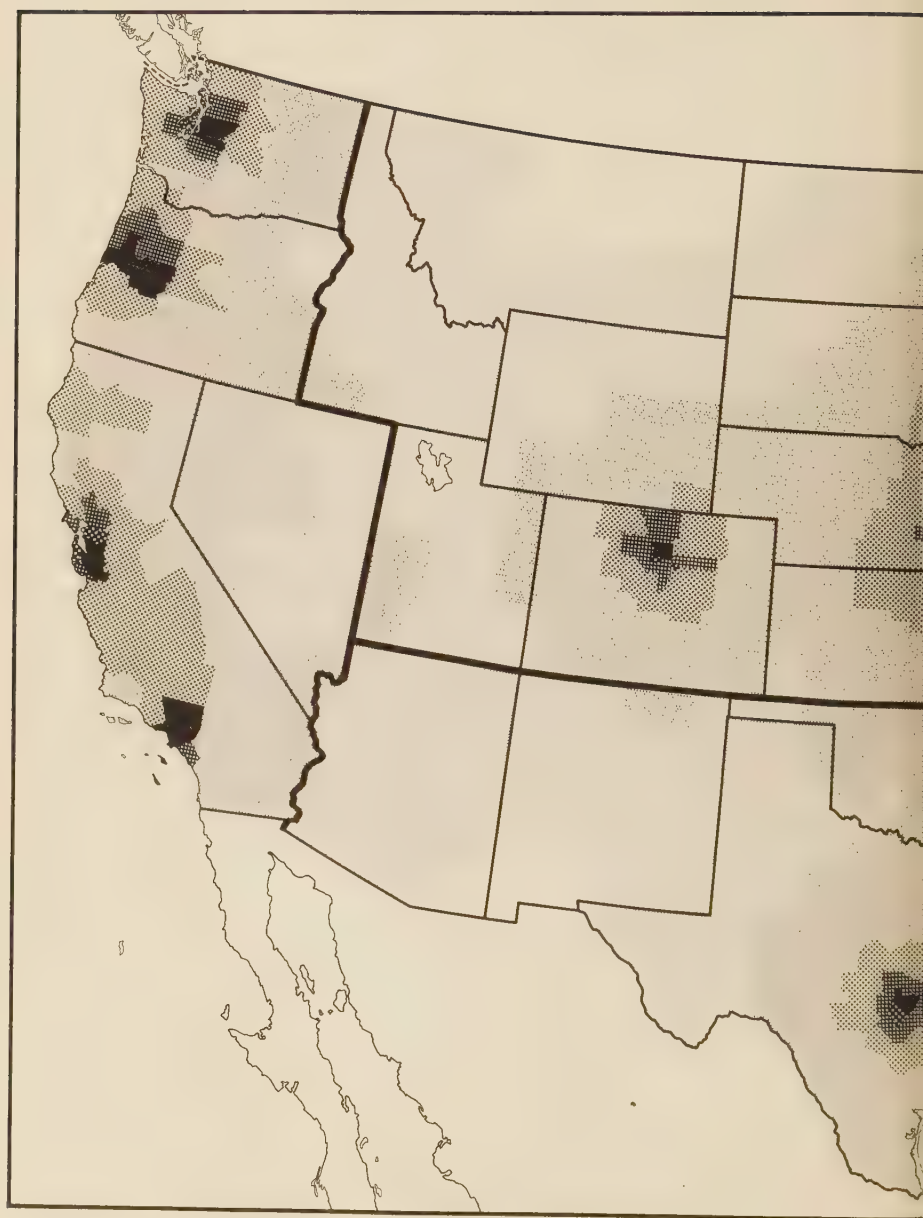
The counties which had indices equivalent to at least one institution within a 25-mile radius but not having one located in the county had indices of 154-341 (100+54 to 287+54). The next category, namely, indices of 97-153, included the counties with indices equivalent to having only one institution within the 26-50-mile zone (43+54) and up to but not including one institution

within 25 miles. The group which had indices of 72-96 included the counties with indices equivalent to having one institution within the 51-100-mile zone up to but not including one within 50 miles. Those in the 60-71 group had indices equivalent to having one institution in the 101-250-mile zone and up to but not including one within 100 miles. Likewise, those in the 56-59 category had indices equivalent to having one institution within the 251-500-mile zone and up to but not including one within 250 miles. In the 55 group were the counties with all fifty-five institutions over 500 miles away from each county.

Patterns Found by Classifying the Counties
According to Their Indices of Graduate-
School Availability

The geographical distribution of the counties according to their indices of graduate-school availability as given in Figure 7 shows that, except for isolated clusters, the darker shades are concentrated in the Northeast, the Middle States, and the Pacific Coast states of the Far West. The Southeast, Southwest, and Northwest regions tend to have lighter shades except for isolated areas of dark and for the areas which are contiguous with the dark shades of the Northeast and Middle States regions. There are darker shades in a larger portion of the Southeast than of either the Southwest or Northwest. Likewise, in Table 36 the counties of the Southwest and the Northwest clustered in the rows with lower indices whereas those in the Northeast region were found in the higher ones.

The regional distribution of the quotas of expected graduate students, as given in Table 37, shows that large portions of the population lived relatively near the institutions. Nearly one-fourth of the aggregate quota, or 11,026 of the 44,326, lived in the forty-seven counties in which these fifty-five institutions are located. Of these, over 50 per cent, or 6,254, lived in the Northeast region, and over 9,500 in the Northeast and Middle States regions, combined. The Far West added over 1,200 more which left approximately 250 in the remaining three regions, and, of these, 178 were in the Southeast region. There were in all 73 counties with indices equivalent to having at least one institution located in each county. Of their aggregate quota of 13,162, more than 8,000 were in the Northeast, more than 3,000 in the Middle States,



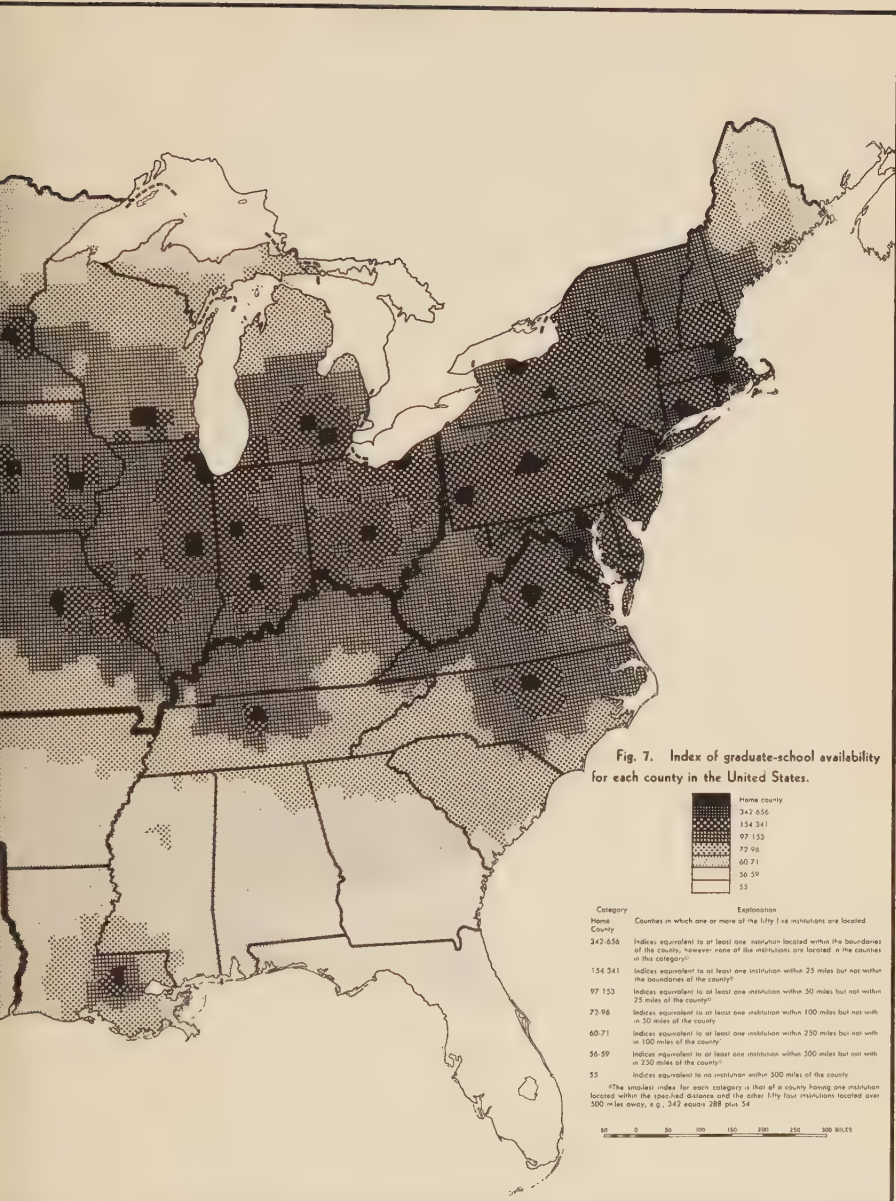


TABLE 36

REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING TO
THEIR INDICES OF GRADUATE-SCHOOL AVAILABILITY

Index of Graduate- School Avail- ability for the County (1)	Row (2)	Number of Counties in Each Region Having Indi- cated Indices of Graduate-School Availability						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
55.....	A	...	...	31	7	24	...	62
56-59.....	B	...	5	97	113	175	8	398
60-71.....	C	3	39	278	213	194	73	800
72-96.....	D	6	131	253	33	102	45	570
97-153.....	E	81	358	247	8	32	14	740
154-341.....	F	164	188	61	1	6	4	424
342-656.....	G	24	...	2	...	...	...	26
Home county..	H	17	15	5	1	3	6	47
Total.....	I	295	736	974	376	536	150	3,067

TABLE 37

REGIONAL DISTRIBUTION OF THE QUOTAS WITH THE COUNTIES
CLASSIFIED ACCORDING TO THEIR INDICES
OF GRADUATE-SCHOOL AVAILABILITY

Index of Graduate- School Avail- ability for the County	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Indices of Graduate-School Availability						
	North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions
55.....	.....	.....	303.5	95.5	73.6	.....	472.6
56-59.....	.....	16.7	658.6	667.7	682.0	27.8	2,058.0
60-71.....	43.9	274.7	2,942.2	2,303.9	703.9	494.0	6,772.0
72-96.....	67.5	804.5	2,698.8	387.3	548.3	657.9	5,164.0
97-153...	1,370.9	3,674.8	2,059.1	61.3	330.4	217.7	7,714.2
154-341..	3,969.7	3,999.5	540.0	5.3	138.9	333.9	8,987.2
342-656..	2,107.3	.....	23.8	.....	.....	.....	2,136.1
Home county.	6,253.8	3,265.7	178.4	31.7	57.2	1,238.9	11,025.0
Total..	13,813.1	12,035.9	9,409.4	3,558.2	2,539.3	2,970.2	44,326.0

and less than 300 in the Northwest, Southwest, and Southeast regions combined, with over 200 of these in the last-mentioned region.

Not one of the fifty-five institutions is located within 500 miles of 62 counties which are in the Southeast, Southwest, and Northwest regions. The aggregate quota for these counties was 473 students, and two-thirds of these youths resided in the 31 counties located in the Southeast region. In addition to these 62 there are 398 more counties, each of which had an index of availability of less than 60 (equivalent to no institution within 250 miles of the county). None of these counties are located in the Northeast region, 5 are in the Middle States, and 8 are in the Far West. According to their aggregate quotas, these 460 counties should have had 2,531 students, and of these only 45 should have been from homes located in the Middle States and Far West regions, leaving nearly 2,500 who should have been from the Southeast, Southwest, and Northwest regions.

The 1,260 counties, each of which had an index of availability of less than 72 (equivalent to no institution located within 100 miles), should have produced 9,304 students with 3,904 from the Southeast region, 3,072 from the Southwest, and 1,464 from the Northwest; hence, these three regions should have accounted for 8,440 of the 9,304. Furthermore, these figures included nearly 85 per cent of the aggregate quota for the entire Southwest region and over 50 per cent of that for the Northwest region.

The 47 counties in which the institutions are located accounted for 23,419, or over 50 per cent, of the students (see Table 38). Of these, more than half--13,048--were in the Northeast region, nearly one-third--7,185--were in the Middle States, and nearly one-tenth--2,132--were in the Far West. The first two regions, therefore, had 20,233 of the students, and all three of these regions had 22,365 of the 23,419 students in this category. The distribution of the students for the 73 counties which had indices equivalent to having one institution located therein, namely, Rows G and H, was just as striking; for 15,645 of the 26,066 students were located in the Northeast region.

At the other extreme, the 62 counties with none of the fifty-five institutions located within 500 miles, namely, Row A, should have had 473 students instead of the 144 which they did have. Likewise, the 460 counties which had indices below 60, namely, Rows A and B, should have had 2,531 students in place of

the 938 they did have. If these counties are taken by regions, the Southeast should have had nearly 1,000 students instead of 179; the Southwest, 763 instead of 272; and the Northwest, 756 instead of 473.

TABLE 38

REGIONAL DISTRIBUTION OF THE STUDENTS WITH THE COUNTIES
CLASSIFIED ACCORDING TO THEIR INDICES OF
GRADUATE-SCHOOL AVAILABILITY

Index of Graduate- School Availability for the County (1)	Row (2)	Number of Students in Each Region for Each Group of Counties Having Indicated Indices of Graduate-School Availability						
		North- east (3)	Middle States (4)	South- east (5)	South- west (6)	North- west (7)	Far West (8)	All Six Regions (9)
55.....	A	.....	.....	79	43	22	.....	144
56-59.....	B	.....	7	100	229	451	7	794
60-71.....	C	14	214	649	1,001	331	460	2,669
72-96.....	D	44	393	661	134	423	561	2,216
97-153.....	E	710	2,737	1,015	26	281	262	5,031
154-341.....	F	3,258	3,118	321	35	144	474	7,350
342-656.....	G	2,597	.....	50	.....	.....	.....	2,647
Home county.	H	13,048	7,185	388	236	430	2,132	23,419
Total.....	I	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^a

^aThe fifty-six students with incomplete addresses are not included in this table.

Again, from the 1,260 counties with county indices smaller than 72, namely, Rows A, B, and C, there were only 3,607 students but an aggregate quota of 9,304. In the Southeast region there were 828 students in place of 3,904; in the Southwest, 1,273 instead of 3,072; and in the Northwest, 804 instead of 1,464. Although these three rows which contained the counties more remote from the fifty-five selected institutions accounted for only 14 of the 19,671 students in the Northeast, only 221 of the 13,654 students in the Middle States, and only 467 of the 3,896 students in the Far West, in the Southeast region they accounted for 828--over one-fourth--of the 3,263 students, in the Northwest they provided 804--nearly two-fifths-- of the 2,082 students, and in the Southwest they supplied 1,273--over two-thirds--of the 1,704 students.

The ratios of the students to the quotas, as given in Table 39, showed a tendency to increase with a decrease in distance. In Column 10 are given the ratios of the cumulative totals of the students to the aggregate quotas. This column shows a slight but steady increase up to Row H, where there was a very marked increase in the ratio.

TABLE 39

REGIONAL DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH
THE COUNTIES CLASSIFIED ACCORDING TO THEIR INDICES
OF GRADUATE-SCHOOL AVAILABILITY^a

Index of Gradu- ate- School Availa- bility for the County	Row	Student-Quota Ratio in Each Region for Each Group of Counties Having Indicated Indi- ces of Graduate-School Availability							Ratio of the Cumu- lative Sums of the Stu- dents to the Cumula- tive Sums of the Quotas
		North- east	Middle States	South- east	South- west	North- west	Far West	All Six Regions	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
55.....	A	...	...	26	45	30	...	30	30
56-59...	B	...	42	15	34	66	25	39	37
60-71...	C	32	78	22	43	47	93	39	39
72-96...	D	65	49	24	35	77	85	43	40
97-153.	E	52	74	49	42	85	120	65	49
154-341	F	82	78	59	660	104	142	82	58
342-656	G	123	...	174	...	...	...	124	63
Home County	H	209	220	217	744	752	172	212	100
All coun- ties...	I	142	113	35	43	82	131	100	...

^aThe entries in this table give the number of students per 100 expected graduate students.

Although many counties are remote from the included graduate institutions and although there are marked variations in the availability of the institutions to persons in the various counties and regions, it is none the less true that the existing graduate schools are available, as shown by the indices, to a large portion of the population of the United States. It can also be seen that the areas which are remote from the institutions fall far short of their quotas of students, whereas the areas fortunate enough to have near-by graduate institutions exceed their quotas.

Patterns Found by Classifying the Counties According to Their Plane-of-Living Indices

The plane-of-living indices¹ were used in measuring the socio-economic status of each of the 3,067 counties. The distribution of the county indices is shown in Figure 8, and the general pattern is similar to the patterns in the previous figures except that in Figure 8 the lowest indices tend to be concentrated in the Southeast and Southwest regions. With the exception of certain areas, the Northwest region is next in order. Even though it is true, as on the other maps, that the higher values tend to be concentrated in the Northeast, Middle States, and Far West regions, it is evident that in this case the darker shades extend farther west, especially into the states of Kansas, Nebraska, South Dakota, Colorado, and Wyoming. Also, there are more isolated clusters of counties with darker shades in the Northwest region. On the other hand, this map has more areas of light shades in the northern sections of the Middle States, namely, in the states of Minnesota, Wisconsin, and Michigan, as well as along the southern side of the Northeast and Middle States regions, namely, in the states of Maryland, West Virginia, and Missouri.

The regional distribution of the counties according to the plane-of-living indices as given in Table 40 indicates that in four regions the number of counties with indices below 40 was relatively small, and in each case most of the counties fell in Rows C, D, and E. In the remaining two regions the distribution of the counties varied markedly. Nearly 850 of the 974 counties in the Southeast region had indices of less than 40 while only 28 had indices of 70 or more and only 5 of these were above the national average, or 100. Nearly three-fourths of the counties in the Southwest region fell in Rows B and C. The figures in Column 9 were noticeably affected by the large concentration of the counties of the Southeast and Southwest regions in Rows A, B, and C.

In Table 41 the regional distribution of students reveals

¹University of Pennsylvania, Wharton School of Finance and Commerce, Migration and Economic Opportunity, pp. 17-27. Philadelphia: University of Pennsylvania Press, 1936. (In Migration and Economic Opportunity the plane-of-living indices are given in map form only. The actual indices were obtained and used through the courtesy of Dr. Carter Goodrich and the University of Pennsylvania Press.)

TABLE 40

REGIONAL DISTRIBUTION OF THE COUNTIES ACCORDING
TO THEIR PLANE-OF-LIVING INDICES

Plane-of-Living Index for the County ^a	Row	Number of Counties in Each Region Having the Indicated Indices of Plane of Living						
		North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0-14.....	A	6	8	428	34	5	...	481
15-39.....	B	33	35	412	145	40	3	668
40-69.....	C	46	144	106	149	156	21	622
70-99.....	D	78	250	23	34	171	63	619
100-129.....	E	85	238	4	14	147	43	531
130 and over	F	47	61	1	...	17	20	146
All counties	G	295	736	974	376	536	150	3,067

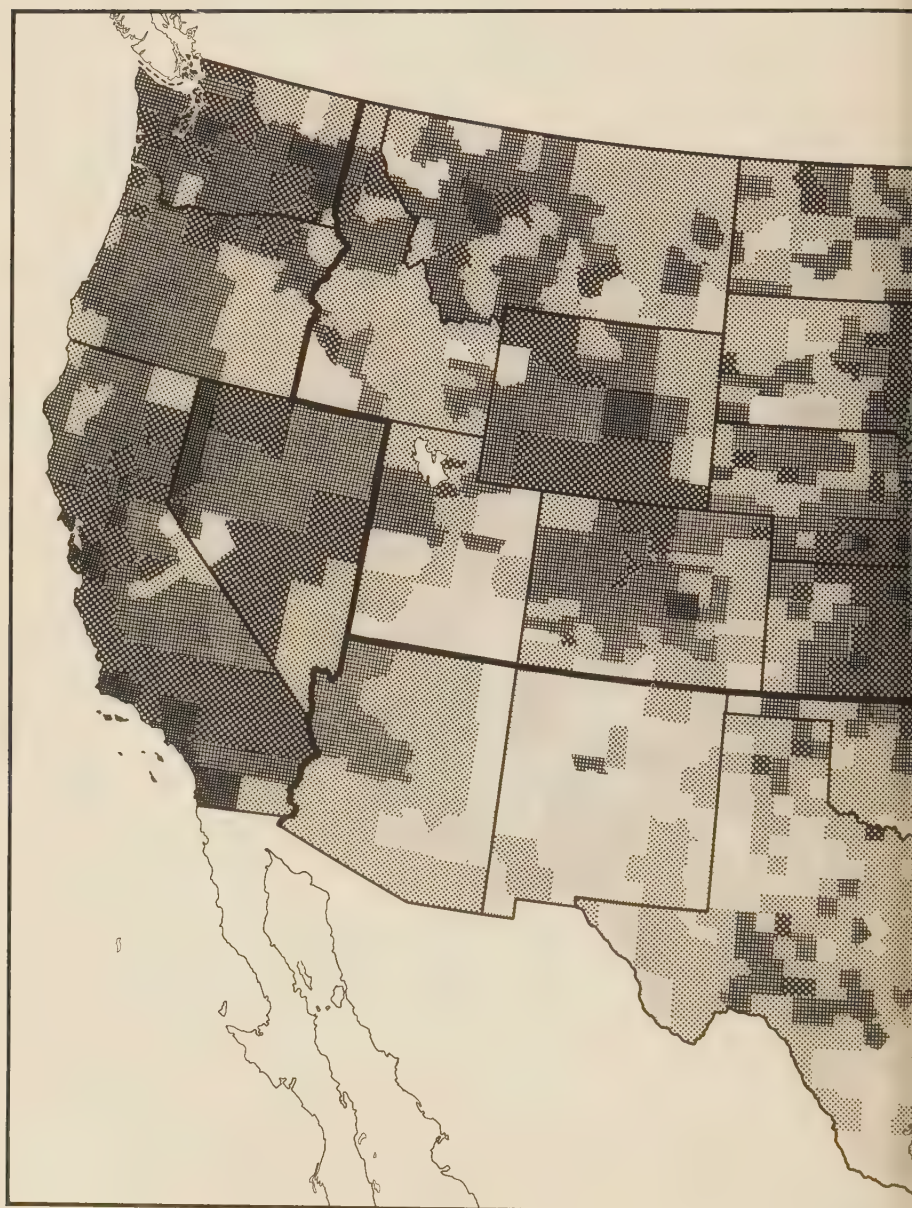
^aThe intervals in this column were taken from the map opposite page 14 in Migration and Economic Opportunity.

TABLE 41

REGIONAL DISTRIBUTION OF THE STUDENTS WITH THE COUNTIES CLASSIFIED
ACCORDING TO THEIR PLANE-OF-LIVING INDICES

Plane-of-Living Index for the County	Row	Number of Students in Each Region for Each Group of Counties Having Indicated Indices of Plane of Living						
		North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
0-14.....	A	0	4	394	13	0	.....	411
15-39.....	B	59	36	1,008	233	14	0	1,350
40-69.....	C	322	434	902	711	191	24	2,584
70-99.....	D	1,104	1,587	680	497	377	445	4,690
100-129.....	E	3,400	4,072	245	250	921	531	9,419
130 and over	F	14,786	7,521	34	.....	579	2,896	25,816
All counties	G	19,671	13,654	3,263	1,704	2,082	3,896	44,270 ^a

^aThe fifty-six students with incomplete addresses are not included in this table.



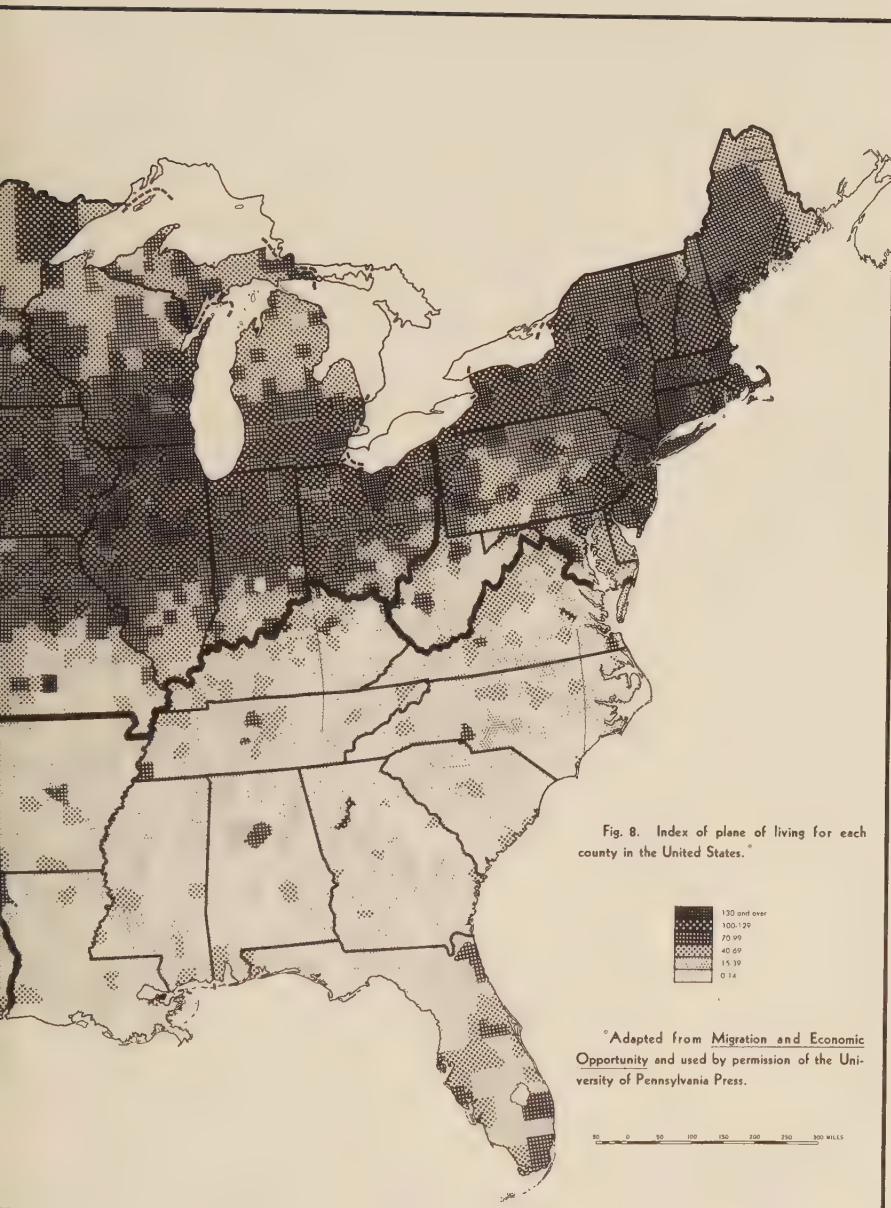


Fig. 8. Index of plane of living for each county in the United States.

*Adapted from *Migration and Economic Opportunity* and used by permission of the University of Pennsylvania Press.

that nearly all of the students in Row A were from the Southeast region. Three regions had no students in that row; as a matter of fact, in the Far West region there were no students in Rows A and B. At the other extreme, although very few of the total number of students in Row F were from the Southeast and none were from the Southwest, over one-fourth of the students from the Northwest region, over one-half of those from the Middle States, nearly three-fourths of those from the Far West, over two-thirds of those from the Northeast, and considerably more than one-half of the students from the 3,067 counties fell in this row. In the Northeast, Middle States, and Far West regions the number of students increased as the plane-of-living indices increased. This was also true of the Northwest region up to Row F; the two remaining regions, however, show marked deviations from this trend.

It is interesting to note that the students followed the same general pattern in Table 41 as the population did in Table 42. The population was more evenly distributed in that there was not quite so much concentration in the rows for the higher indices, but it was evident that, in general, the trends were very similar. Additional data are presented in Table 43 which gives the student-quota ratio in each region and which shows that the wealthier counties tend to have higher student-quota ratios.

Owing to the manner in which the plane-of-living indices were worked out by Goodrich and his associates, it was possible to obtain the plane-of-living indices for areas within each region--areas made up of counties having the indicated indices of graduate-school availability. Except for the first number of Column 8 of Table 44 there was a gradual increase in the size of the plane-of-living indices from the more remote counties to the counties which are nearer the institutions. Although there was more fluctuation in the figures for each region, the same general trend was noted in each of them except the Southwest region. The trend was especially noticeable in the Northeast, Middle States, Northwest, and Far West regions.

Thus it appears that the wealthy counties have not only larger percentages of the population than those with smaller plane-of-living indices but also still larger percentages of the students in that larger portions of their populations take advantage of graduate instruction. The more remote areas, furthermore, are lower on the socio-economic scale than are the areas which are

TABLE 42

REGIONAL DISTRIBUTION OF THE QUOTAS WITH THE COUNTIES CLASSIFIED ACCORDING TO THEIR PLANE-OF-LIVING INDICES

Plane-of-Living Index for the County	Aggregate Quota in Each Region for Each Group of Counties Having Indicated Indices of Plane of Living						
	North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
0-14....	24.3	31.4	2,504.3	144.5	5.5	.....	2,710.0
15-39...	287.2	141.4	3,607.1	967.1	76.5	1.9	5,081.2
40-69...	575.9	757.8	1,566.1	1,300.0	404.4	78.1	4,682.3
70-99...	1,666.7	2,125.2	1,297.2	512.0	735.1	471.1	6,807.3
100-129.	3,757.9	3,807.4	399.9	634.6	978.6	506.6	10,085.0
130 and over..	7,501.1	5,172.7	34.8	.....	339.2	1,912.5	14,960.3
Total.	13,813.1	12,035.9	9,409.4	3,558.2	2,532.3	2,970.2	44,326.1

TABLE 43

REGIONAL DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE COUNTIES CLASSIFIED ACCORDING TO THEIR PLANE-OF-LIVING INDICES^a

Plane-of-Living Index for the County	Student-Quota Ratio in Each Region for Each Group of Counties Having Indicated Indices of Plane of Living						
	North-east	Middle States	South-east	South-west	North-west	Far West	All Six Regions
0-14.....	0	13	16	9	0	...	15
15-39.....	21	25	28	24	13	0	27
40-69.....	56	57	58	55	47	31	55
70-99.....	66	74	52	97	51	94	69
100-129.....	90	107	61	39	94	105	93
130 and over..	197	145	98	...	171	151	173
All counties..	142	113	35	43	82	131	100

^aThe entries in this table indicate the number of students per 100 expected graduate students.

TABLE 44

REGIONAL DISTRIBUTION OF THE PLANE-OF-LIVING INDICES
WITH THE COUNTIES CLASSIFIED ACCORDING TO THEIR
INDICES OF GRADUATE-SCHOOL AVAILABILITY

Index of Graduate-School Availability for the County (1)	Plane-of-Living Indices in Each Region for Each Group of Counties Having Indicated Indices of Graduate-School Availability						
	North- east (2)	Middle States (3)	South- east (4)	South- west (5)	North- west (6)	Far West (7)	All Six Regions (8)
55.....	...	...	61	56	74	...	62
56-59.....	...	63	27	49	79	84	53
60-71.....	64	83	32	60	89	105	56
72-96.....	93	76	31	56	107	113	61
97-153.....	90	106	36	41	119	117	85
154-341.....	105	117	53	47	142	199	110
342-656.....	142	...	91	...	...	...	141
Home county...	149	157	72	73	135	165	152
All counties..	127	119	35	57	97	141	100

nearer the present graduate schools. This discussion raises the question of cause and effect. Do wealthy communities naturally develop graduate institutions or do the communities become wealthy, at least in a large part, because of the contributions of the graduate schools? Or are cause and effect interrelated in that wealthy communities encourage the development of graduate schools and in turn the contributions of the school increase the wealth of the communities?

CHAPTER IV

THE EXTENT TO WHICH THE GRADUATE INSTITUTIONS SERVE THE POPULATION OF SELECTED AREAS IN THE UNITED STATES

Introduction

In order to discover in what parts of the country relatively small portions of the population were using the services of the selected graduate institutions and in what parts relatively large portions were using these services, it was important to study the national patterns of the ratios of students to quotas, namely, the number of students per 100 expected graduate students, as given in chapter iii.¹

It will be recalled that relatively few--459--of the 3,067 counties had student-quota ratios ranging from 101:100 to 1,750:100; in contrast, 819 had no graduate students whatever, 452 had ratios ranging from 1:100 to 25:100, and 632 had ratios ranging from 26:100 to 50:100. These facts are shown in Table 31 (see p.65).

From Table 32 (see p. 66) it can be seen that on the basis of the distribution of the quotas of expected graduate students 15,521 students should have come from the 459 counties with student-quota ratios larger than 100:100; but, as shown in Table 34, actually 31,560 students came from these counties. Although there should have been 3,099 students from the 819 counties with ratios of 0:100, there were, of course, no students. There should have been 5,094 students from the 452 counties with ratios ranging from 1:100 to 25:100, yet there were only 827 students. And, finally, even though there should have been 8,460 students from the 632 counties with student-quota ratios ranging from 26:100 to 50:100, there were actually only 3,201.

If the portion of local populations which actually received the instruction is considered, it appears that there were gross inequalities in the opportunities offered the individuals who lived in various sections. The tables record decided variations

¹Supra, pp. 61-68.

from region to region, while the maps show similar variations within each of the six regions as well. These extreme differences between the distribution of the students and of quotas of expected graduate students indicate that the population of certain counties appeared to have had relatively little opportunity and that the population of other counties appeared to have had unusual opportunity to attend these graduate institutions.

To allow for reasonable variations and yet to permit special attention to be given to the extremes, those counties for which the student-quota ratios ranged from 0:100 to 50:100 were considered counties which offered limited opportunities to their youth, and those with ratios ranging from 251:100 to 1,750:100 were considered counties which offered unusual opportunities. On this basis 1,903--62.0 per cent--of the 3,067 counties offered relatively little opportunity to their youth for graduate study; according to their quotas, these 1,903 counties should have had 16,653 students in place of the 4,028 which they did have. The fact that a group of counties which should have furnished over one-third of the students actually produced less than one-tenth of them indicates that the youth of these counties had very little (possibly even inadequate) opportunity for study.

By contrast, the fifty-five counties with ratios ranging from 251:100 to 1,750:100 should have had 4,728 students but actually did have 16,041 students; in other words, they should have furnished slightly more than one-tenth of the students but actually produced over one-third of them. It is evident that these students were being offered unusual opportunity.

Just as it was obvious that the distribution of students varied markedly with the distribution of the population, it was also obvious that the students' homes tended to be grouped, at least in part, around those areas in which the institutions are located. In chapter iii (see p. 45) it was pointed out that those regions in which more than their proportionate share of institutions are located contained the homes of more students than were expected on a basis of their population.

Certain Factors Which Influenced the Student-Quota Ratios

The scatter diagram given in Table 45 indicates the relationship between the county indices of graduate-school availability

TABLE 45

SCATTER DIAGRAM SHOWING THE DISTRIBUTION OF THE COUNTIES
ACCORDING TO THEIR STUDENT-QUOTA RATIOS AND THEIR
INDICES OF GRADUATE-SCHOOL AVAILABILITY

Student- Quota Ratio for the County ^a	Number of Counties in Each Category of Indices of Graduate-School Availability Having Indicated Student-Quota Ratios								Total Number of Counties
	55	56-59	60-71	72-96	97-153	154- 341	342- 656	Home County	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
501 and over....	...	...	1	...	1	1	1	17	21
251-500...	...	1	4	2	8	9	...	10	34
101-250...	1	22	54	53	141	102	15	16	404
76-100....	3	21	49	37	88	78	4	3	283
51-75.....	8	31	74	76	133	93	6	1	422
26-50.....	14	69	152	145	171	81	...	...	632
1-25.....	9	46	169	101	94	33	...	...	452
0.....	27	208	297	156	104	27	...	...	819
Total num- ber of counties	62	398	800	570	740	424	26	47	3,067

^aThe entries in this column indicate the number of students per 100 expected graduate students.

and the county student-quota ratios. There was throughout the variation and wide diffusion a tendency for the counties with the larger indices to have the larger student-quota ratios. When such scatter diagrams were set up for each region,¹ it was noticeable that this relationship was more marked in the Northeast, Far West, and Middle States regions; and these were also the regions which had larger percentages of the fifty-five selected institutions than they had of the population. A similar trend was noticeable in the Northwest region and, to a lesser extend, in the Southeast region. There was very little--if any--trend in the Southwest region, but the Southwest region has very few institutions, and those few are located in a relatively large area; this fact is shown by the frequency distribution of the indices of graduate-school

¹The regional scatter diagrams are given in Appendix XVI.

availability. The Northwest region, likewise, has relatively few institutions located in a relatively large area.

An examination of the distribution of the counties with ratios ranging from 0:100 to 50:100 (see Table 45) reveals that the indices of graduate-school availability of these 1,903 counties varied from 55 to 154-341; 510 of these counties had indices larger than 96. The 141 counties with indices ranging from 154-341 were located mostly in the Northeast and Middle States regions. These two regions also contributed a large portion of the counties with indices from 97-153, as did the Southeast region. The median index for these 1,903 counties was located in Column 4 (the column for county indices of 60-71). Inasmuch as none of the fifty-five counties with student-quota ratios ranging from 251:100 to 1,750:100 had an index of graduate-school availability of 55 and twenty-eight--over half--had indices above 341, there was a marked difference between the central tendencies of the indices of these two groups of counties, namely, those with ratios ranging from 0:100 to 50:100 and from 251:100 to 1,750:100.

Another factor which might have influenced the student-quota ratio was the socio-economic status of each county. From Table 46, which is the scatter diagram of the distribution of the counties by the student-quota ratios and by the plane-of-living indices, it was obvious that there was much variation. There was, however, a distinct trend showing a direct relationship between the student-quota ratios and the plane-of-living indices; for example, the median county in Column 2 had a student-quota ratio of 0:100, the median county in Column 4 had a ratio between 26:100 and 50:100, and the median county in Column 7 had a ratio between 101:100 and 250:100. Furthermore, over 1,000 of the 1,903 counties with student-quota ratios smaller than 51:100 had plane-of-living indices of less than 40, and the median for the 1,903 counties was in Column 3. Less than 200 of these counties had indices equal to or larger than the national figure of 100.

Although the plane-of-living index of one of the fifty-five counties with student-quota ratios larger than 250:100 fell as low as Column 3, nineteen of them had indices larger than 129, and thirty had indices larger than 99. Thus the median for this group is in Column 6 which is distinctly above the median for those counties which had ratios ranging from 0:100 to 50:100.

The marked trends or direct relationships which can be

TABLE 46

SCATTER DIAGRAM SHOWING THE DISTRIBUTION OF THE COUNTIES
ACCORDING TO THEIR STUDENT-QUOTA RATIOS AND THEIR
PLANE-OF-LIVING INDICES

Student-Quota Ratio for the County ^a	Number of Counties in Each Category of Plane-of-Living Indices Having Indi- cated Student-Quota Ratios						
	0-14	15-39	40-69	70-99	100-129	130 and Over	Total Number of Counties
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
501 and over.	...	1	2	5	5	8	21
251-500.....	...	...	6	11	6	11	34
101-250.....	6	26	70	95	146	61	404
76-100.....	11	22	52	77	95	26	283
51-75.....	20	58	86	121	115	22	422
26-50.....	61	147	150	162	102	10	632
1-25.....	106	182	83	53	24	4	452
0.....	277	232	173	95	38	4	819
Total number of counties	481	668	622	619	531	146	3,067

^aThe entries in this column indicate the number of students per 100 expected graduate students.

seen by inspection in the Northeast, Middle States, Northwest, and Far West regions constitute an important part of the interesting information presented by the scatter diagrams for the various regions.¹ Although there was a very definite trend in the Southeast region, it was obscured by the variation in the plane -of-living indices for the counties which had the highest student-quota ratios and also the variation in the ratios for those which had the largest indices. Another point of interest in the scatter diagram for the Southeast region is the clustering of the counties in the lower values of both the ratios and the indices; in fact, 840 of the 974 counties in the Southeast region had indices smaller than 40, and 803 had ratios smaller than 51:100. Of these 803 counties, 733 had indices of less than 40, which shows the extent to which the counties with small ratios tended also to have small indices. In the Southwest region the relationship was not so striking as in the other regions.

¹The scatter diagrams for the various regions are given in Appendix XVII.

In order to complete the picture, the scatter diagram of the distribution of the counties by their indices of graduate-school availability and by their plane-of-living indices is given in Table 47. The relationship was direct, or positive, but it was less marked than in the other two series of scatter diagrams. The relationship appeared to be more outstanding in the Northwest and Far West regions than in the other regions, as can be seen in the scatter diagrams for the various regions.¹

TABLE 47

SCATTER DIAGRAM SHOWING THE DISTRIBUTION OF THE COUNTIES
ACCORDING TO THEIR INDICES OF GRADUATE-SCHOOL AVAIL-
ABILITY AND THEIR PLANE-OF-LIVING INDICES

Index of Graduate- School Avail- ability for the County	Number of Counties in Each Category of Plane-of- Living Indices Having Indicated Indices of Graduate-School Availability						Total Number of Counties
	0-14	15-39	40-69	70-99	100-129	130 and Over	
Home county.	...	1	3	8	13	22	47
342-656.....	...	...	3	3	7	13	26
154-341.....	21	41	61	114	141	46	424
97-153.....	83	157	127	164	171	38	740
72-96.....	128	143	74	116	95	14	570
60-71.....	167	214	188	137	82	12	800
56-59.....	80	95	135	66	21	1	398
55.....	2	17	31	11	1	...	62
Total number of counties	481	668	622	619	531	146	3,067

Two important factors which affected the student-quota ratio have already been examined, but it is true that other factors tended to affect this ratio. For example, it is possible that men and women who are graduate students are more transient and that they tend to cluster around those sections in which they can get positions which appear desirable to them or in which they can have an opportunity to go to school; in checking the reliability of the students' addresses² an attempt was made to locate the students' legal and accepted addresses at the time the lists used in the study on reliability were issued, but no attempt was made to dis-

¹The scatter diagrams for the various regions are given in Appendix XVIII.

²Supra, pp. 17-18.

cover where the students were born, where their childhoods were spent, or where they received their elementary, secondary, and undergraduate college education.

Still other factors may have influenced the data for the various counties. As a matter of fact, it was possible to detect many counties in which institutions not offering doctorates are located, for many of these counties had larger ratios than did the neighboring counties--such counties include Lubbock County, Texas; Saline County, Kansas; Cache County, Utah; Bernallillo County, New Mexico; Watauga County, North Carolina; Oktibbeha County, Mississippi; and Clark and Faulkner Counties, Arkansas.

It is also possible to identify counties for which the ratios were lower than they should have been because it was impossible to obtain all the necessary data for the selected schools located in or near those counties--illustrations include Los Angeles County, California; Ingham County, Michigan; and Greater New York City.¹ On the other hand, certain areas had larger ratios than they should have had, for the lists obtained from some of the selected institutions included some students who should have been omitted. Examples include the University of Colorado, the University of Iowa, the University of Minnesota, the University of Missouri, and the University of Nebraska.²

Relative Importance of Selected Factors Which Have Influenced the Student-Quota Ratios and the Distribution of Students

Of the factors which have influenced the number of graduate students produced by a given area it is reasonable to expect that certain factors were of more relative importance than others. An indication of the relative importance of three selected factors was obtained by taking two factors at a time and finding the distribution of the student-quota ratios and of the percentages of students³ among categories of the one factor when the other factor

¹It will be recalled from page 29 and Appendix VII that although Greater New York City is actually made up of five counties it is treated as one county throughout this study.

²Supplementary material is presented in Appendix XII.

³The tables giving the distributions of the students and of the aggregate quotas--the distributions on which the tables in this section are based--and the tables giving the distribution of the percentages of the aggregate quotas are found in Appendix XIX.

was held constant within the limits of the specified category. The three selected factors included the indices of graduate-school availability, the plane-of-living indices, and the quotas of expected students per thousand square miles--this latter factor being proportional to the density of the population.

The distribution of the student-quota ratios as given in Table 48 shows that for both of these factors--the plane-of-living indices and the indices of graduate-school availability--the ratios for all counties tend to increase gradually from the lowest categories of each factor; there are, however, very marked increases for the two highest categories in the indices of graduate-school availability and the highest category in the plane-of-living indices. These data lead to the conclusion that the student-quota ratios are very sensitive to a high socio-economic status and to near-by institutions which are located in the county or immediate vicinity. Since the ratios tend to increase somewhat more uniformly among the categories of the plane-of-living indices than among the indices of graduate-school availability, it appears that the former factor (the socio-economic status of a county) was more directly related to the student-quota ratios than was the factor of distance except for those counties in the immediate vicinity of a graduate school; the latter counties had extremely large student-quota ratios thereby indicating that for them the factor of distance was the more important and directly related.

From a comparison of the relative importance of the plane-of-living indices and the quota of expected graduate students per thousand square miles, as given in Table 49, it is clearly evident that there is a tendency for the ratios to increase as the plane-of-living indices increase, but a similar trend is much less striking as the quotas increase. This fluctuation in the size of the ratios as the quotas increase reflects--at least in part--the effect of institutions which are located in relatively sparsely populated areas, and the data of the table lead to the conclusion that the student-quota ratio is more sensitive to socio-economic status than to density of population.

A similar conclusion can be drawn concerning the relative influence of indices of graduate-school availability and of quotas per thousand square miles. The material in Table 50 indicates that the student-quota ratio is more sensitive to distance--the index of graduate-school availability--than to density of population.

TABLE 48

DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE COUNTIES
GROUPED ACCORDING TO THEIR INDICES OF GRADUATE-SCHOOL
AVAILABILITY AND THEIR PLANE-OF-LIVING INDICES

Index of Graduate- School Availability for the County	Student-Quota Ratios for Each Group of Counties Having Specified Indices of Graduate-School Availability Which Fell in Each Indicated Category of Plane-of-Living Indices ^a						
	0-14	15-39	40-69	70-99	100-129	130 and Over	All Counties
Home county.	...	833	235	313	159	222	212
342-656.....	...	...	121	110	83	144	124
154-341.....	17	39	63	63	78	106	82
97-153.....	22	32	68	70	84	74	65
72-96.....	17	23	42	49	73	111	43
60-71.....	13	22	44	54	56	106	39
56-59.....	7	21	50	42	78	67	39
55.....	36	28	30	30	46	...	30
All counties	15	27	55	69	93	173	100

^aThe entries in this table give the number of students
per 100 expected graduate students.

TABLE 49

DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE COUNTIES
GROUPED ACCORDING TO THEIR QUOTAS PER THOUSAND SQUARE
MILES AND THEIR PLANE-OF-LIVING INDICES

Quota of Ex- pected Grad- uate Students per Thousand Square Miles	Student-Quota Ratios for Each Group of Counties Having Specified Quotas per Thousand Square Miles Which Fell in Each Indicated Cate- gory of Plane-of-Living Indices ^a						
	0-14	15-39	40-69	70-99	100-129	130 and Over	All Counties
201.0 and over.....	...	...	...	44	109	177	158
51.0-200.9..	...	31	54	54	67	108	72
26.0-50.9...	15	21	54	126	87	371	104
11.0-25.9...	15	29	67	81	114	172	63
6.0-10.9....	17	29	56	75	92	118	59
2.0-5.9.....	9	20	42	64	73	139	48
1.0-1.9.....	15	19	36	69	58	65	45
0.0-0.9.....	0	24	29	28	21	0	26
All counties	15	27	55	69	93	173	100

^aThe entries in this table give the number of students
per 100 expected graduate students.

TABLE 50

DISTRIBUTION OF THE STUDENT-QUOTA RATIOS WITH THE COUNTIES
GROUPED ACCORDING TO THEIR INDICES OF GRADUATE-
SCHOOL AVAILABILITY AND THEIR QUOTAS
PER THOUSAND SQUARE MILES

Index of Graduate- School Availa- bility for the County	Student-Quota Ratios for Each Group of Counties Having Specified Indices of Graduate-School Availability Which Fell in Each Indicated Category of Quotas per Thousand Square Miles ^a								
	0.0- 0.9	1.0- 1.9	2.0- 5.9	6.0- 10.9	11.0- 25.9	26.0- 50.9	51.0- 200.9	201.0 and Over	All Counties
Home county...	...	...	345	563	822	836	129	200	212
342-656...	...	...	...	...	93	526	104	125	124
154-341...	...	...	39	93	78	84	71	95	82
97-153...	105	56	57	71	69	65	63	55	65
72-96....	57	47	44	55	36	37	38	55	43
60-71....	30	55	45	40	34	36	43	37	39
56-59....	24	36	47	50	29	29	45	...	39
55.....	8	38	30	42	24	21	37	...	30
All coun- ties...	26	45	48	59	63	104	72	158	100

^aThe entries in this table give the number of students per 100 expected graduate students.

The relative importance of these factors may also be examined by observing what per cent of all students having the same average value of one factor fell in the various categories of a second factor.¹ In other words, Table 51 shows what per cent of the students residing in the "home county" category came from counties with the indicated plane-of-living indices; this pattern is given for each category of the indices of graduate-school availability. Although the students in most cases were scattered through nearly all the categories of plane-of-living indices, most of the students residing in areas near graduate institutions came from wealthy counties whereas most of the students residing in areas remote from the graduate institutions came from poorer counties. For example, 64 per cent of the students living in counties in which no institution is located within 500 miles lived in counties with plane-of-living indices smaller than 70. Inspection of the table shows that the median percentages of students

¹The pattern of the tables giving the per cent of students can be compared with the pattern of the tables giving the per cent of the aggregate quotas (see Appendix XIX).

TABLE 51

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED INDICES OF GRADUATE-SCHOOL AVAILABILITY
THROUGH THE CATEGORIES OF PLANE-OF-LIVING INDICES

Index of Graduate- School Availability for the County	Percentage of Total Number of Students in Each Group of Counties Having Specified Indices of Graduate-School Availability Which Fell in Each Indicated Category of Plane-of-Living Indices						
	0-14	15-39	40-69	70-99	100-129	130 and Over	Total
Home county.	...	0.3	0.8	3.7	14.4	80.8	100.0
342-656.....	...	....	1.7	1.6	21.4	75.3	100.0
154-341.....	0.2	1.0	5.9	15.8	31.7	45.4	100.0
97-153.....	2.0	7.8	12.5	22.7	34.2	20.8	100.0
72-96.....	5.9	15.0	10.6	30.8	24.4	13.3	100.0
60-71.....	5.1	14.3	24.8	22.8	25.4	7.6	100.0
56-59.....	3.3	12.0	40.8	18.1	25.3	0.5	100.0
55.....	2.1	10.4	52.1	30.5	4.9	....	100.0
All counties	0.9	3.0	5.8	10.6	21.3	58.4	100.0

increase in size rather uniformly from the more remote categories to the counties relatively near the institutions. Of all the included students 58.4 per cent came from counties with plane-of-living indices larger than 129. Certainly the table indicates that the majority of the students residing in counties near institutions came from wealthy counties.

Although not so pronounced, a similar trend can be seen in Table 52 which shows, for example, the per cent of the students residing in counties with plane-of-living indices of 130 and over which came from counties with the selected indices of graduate-school availability. In other words, in spite of the fluctuations there was a tendency for most of the students from wealthy counties to come from counties near a graduate institution.

It is true that the students from the wealthy counties (see Table 53) tended to come from more densely populated counties; many students, however, came from counties which had fairly good plane-of-living indices but were rather sparsely settled. Also--as shown in Table 54--the students from the wealthier counties tended to come from more densely populated counties, but many students from the counties with larger quotas per thousand square miles came from counties which had relatively small plane-of-living

indices.

TABLE 52

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED PLANE-OF-LIVING INDICES THROUGH THE CATE-
GORIES OF INDICES OF GRADUATE-SCHOOL AVAILABILITY

Plane-of-Living Index for the County	Percentage of Total Number of Students in Each Group of Counties Having Specified Plane-of- Living Indices Which Fell in Each Indi- cated Category of Indices of Graduate-School Availability								
	55	56-59	60-71	72-96	97-153	154-341	342- 656	Home County	Total
130 and over....	...	0.0	0.8	1.1	4.0	12.9	7.7	73.5	100.0
100-129....	0.1	2.2	7.2	5.7	18.3	24.7	6.0	35.8	100.0
70-99.....	0.9	3.1	13.0	14.6	24.4	24.7	0.9	18.4	100.0
40-69.....	2.9	12.5	25.7	9.1	24.3	16.8	1.8	6.9	100.0
15-39.....	1.1	7.0	28.2	24.6	29.1	5.6	...	4.4	100.0
0-14.....	0.7	6.3	32.9	31.6	24.1	4.4	...	....	100.0
All coun- ties....	0.3	1.8	6.0	5.0	11.4	16.6	6.0	52.9	100.0

TABLE 53

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED PLANE-OF-LIVING INDICES THROUGH THE
CATEGORIES OF QUOTAS PER THOUSAND SQUARE MILES

Plane-of-Living Index for the County	Percentage of Total Number of Students in Each Group of Counties Having Specified Plane-of-Living Indi- ces Which Fell in Each Indicated Category of Quotas per Thousand Square Miles								
	0.0- 0.9	1.0- 1.9	2.0- 5.9	6.0- 10.9	11.0- 25.9	26.0- 50.9	51.0- 200.9	201.0 and Over	Total
130 and over.....	0.0	0.1	0.1	0.4	2.7	8.1	9.5	79.1	100.0
100-129....	0.1	0.2	2.9	9.6	20.7	12.3	17.2	37.0	100.0
70-99.....	0.5	2.2	9.6	17.4	21.1	16.1	28.1	5.0	100.0
40-69.....	1.4	2.5	10.1	14.4	36.2	17.4	18.0	....	100.0
15-39.....	1.3	1.0	4.3	16.4	53.8	16.5	6.7	....	100.0
0-14.....	0.0	1.2	5.4	30.9	57.6	4.9	....	....	100.0
All coun- ties.....	0.2	0.5	2.5	5.8	12.5	10.6	13.4	54.5	100.0

TABLE 54

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED QUOTAS PER THOUSAND SQUARE MILES THROUGH
THE CATEGORIES OF PLANE-OF-LIVING INDICES

Quota of Ex- pected Gradu- ate Students per Thousand Square Miles	Percentage of Total Number of Students in Each Group of Counties Having Specified Quotas per Thousand Square Miles Which Fell in Each Indicated Category of Plane-of-Living Indices						
	0-14	15-39	40-69	70-99	100-129	130 and Over	Total
201.0 and over.....	...	....	....	1.0	14.5	84.5	100.0
51.0-200.9....	...	1.5	7.8	22.2	27.2	41.3	100.0
26.0-50.9....	0.4	4.7	9.6	16.1	24.6	44.6	100.0
11.0-25.9....	4.3	13.1	16.9	17.9	35.2	12.6	100.0
6.0-10.9....	5.0	8.7	14.5	31.9	35.6	4.3	100.0
2.0-5.9....	2.0	5.3	23.9	41.3	24.7	2.8	100.0
1.0-1.9....	2.2	6.3	29.1	46.7	6.7	9.0	100.0
0.0-0.9....	0.0	20.5	44.6	27.7	7.2	0.0	100.0
All counties.	0.9	3.0	5.8	10.6	21.3	58.4	100.0

On the other hand, there is a marked tendency, as shown in Table 55, for more of the students residing in counties near an institution to come from densely populated counties whereas relatively more of the students residing in the more remote counties came from sparsely populated counties. Likewise, Table 56 shows a strong tendency for most of the students from the densely populated counties to come from counties near one or more institutions and for large percentages of the students residing in sparsely populated counties to come from counties which had low indices of graduate-school availability.

Although in each of the three factors the majority of students came from the category with the highest value--the categories of "home county" for the index of graduate-school availability, "130 and over" for the plane-of-living indices, and "201.0 and over" for the quota of expected graduate students--this discussion of the relative importance of these three factors tends to indicate that the density of population is of less importance than the socio-economic status or the proximity to graduate schools. Of the two latter factors the socio-economic status appeared to have somewhat more influence except for those counties which were in

TABLE 55

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED INDICES OF GRADUATE-SCHOOL AVAILABILITY
THROUGH THE CATEGORIES OF QUOTAS PER
THOUSAND SQUARE MILES

Index of Graduate- School Availability for the County	Percentage of Total Number of Students in Each Group of Counties Having Specified Indices of Graduate- School Availability Which Fell in Each Indi- cated Category of Quotas per Thousand Square Miles								
	0.0- 0.9	1.0- 1.9	2.0- 5.9	6.0- 10.9	11.0- 25.9	26.0- 50.9	51.0- 200.9	201.0 and Over	Total
Home county.	...	...	0.3	0.2	4.0	8.8	7.3	79.4	100.0
342-656.....	...	...	...	...	1.3	3.0	12.2	83.5	100.0
154-341.....	...	...	0.1	5.1	17.4	14.7	29.3	33.4	100.0
97-153.....	0.0	0.0	1.7	16.2	34.9	18.6	16.0	12.6	100.0
72-96.....	0.1	0.9	10.4	28.8	28.7	10.8	12.4	7.9	100.0
60-71.....	1.2	4.3	16.1	19.1	27.3	9.6	20.3	2.1	100.0
56-59.....	5.8	9.3	29.7	20.0	18.8	3.7	12.7	...	100.0
55.....	1.4	9.7	21.5	11.1	12.5	8.3	35.5	...	100.0
All counties	0.2	0.5	2.5	5.8	12.5	10.6	13.4	54.5	100.0

TABLE 56

DISTRIBUTION OF THE PERCENTAGES OF ALL STUDENTS FROM COUNTIES
WITH SPECIFIED QUOTAS PER THOUSAND SQUARE MILES THROUGH THE
CATEGORIES OF INDICES OF GRADUATE-SCHOOL AVAILABILITY

Quota of Expected Graduate Students per Thousand Square Miles	Percentages of Total Number of Students in Each Group of Counties Having Specified Quotas per Thousand Square Miles Which Fell in Each Indicated Category of Indices of Graduate- School Availability								
	55	56-59	60-71	72-96	97-153	154-341	342- 656	Home County	Total
201.0 and over....	...	...	0.2	0.7	2.6	10.2	9.2	77.1	100.0
51.0-200.9	0.9	1.7	9.1	4.6	13.6	36.2	5.4	28.6	100.0
26.0-50.9.	0.3	0.6	5.5	5.1	19.9	23.0	1.7	43.9	100.0
11.0-25.9.	0.3	2.7	13.2	11.5	31.7	23.1	0.6	16.9	100.0
6.0-10.9..	0.6	6.2	20.0	25.0	32.0	14.8	...	1.4	100.0
2.0-5.9...	2.8	21.6	39.4	21.1	7.9	1.0	...	6.3	100.0
1.0-1.9...	6.3	33.2	51.6	8.5	0.4	...	...	...	100.0
0.0-0.9...	2.4	55.4	37.3	2.4	2.4	...	...	...	100.0
All coun- ties....	0.3	1.8	6.0	5.0	11.4	16.6	6.0	52.9	100.0

the immediate vicinities of universities; for these counties the index of graduate-school availability appears to be the most important of the three factors.

Counties with Student-Quota Ratios Ranging
from 251:100 to 1,750:100

Areas with student-quota ratios larger than 250:100 were for the most part isolated counties or in several instances clusters of two or more counties, for the fifty-five counties which had such ratios are scattered throughout twenty-six states. Twenty of the fifty-five counties are located in the Middle States; ten, in the Northeast; eight, in the Far West; a like number, in the Northwest; six, in the Southeast; and three, in the Southwest. But this pattern of the regional distribution of these counties is somewhat misleading. That five of the counties were in Missouri--four of which formed a cluster around the University of Missouri--is at least partially due to the fact that the list of students from the University of Missouri included some graduate students who would have been eliminated if it had been possible to do so. In the states of Indiana, Illinois, and Iowa there were four, three, and three counties, respectively; in each of these states there were no clusters, for the counties were scattered. In central Ohio, Franklin and a contiguous county formed a small cluster around Ohio State University.

In the Northeast region there were two clusters of counties. Greater New York City and a contiguous county (Westchester) formed one cluster; however, if all desired data could have been obtained, this cluster might have been larger. The other cluster consisted of the District of Columbia and two contiguous Maryland counties (Montgomery and Prince Georges); there are four institutions in the District of Columbia, and the main campus of the University of Maryland is located in Prince Georges County. The two counties in Massachusetts and those in Pennsylvania were scattered counties. The University of Pennsylvania and Temple University are both located in Philadelphia County, which had a student-quota ratio of 120:100, and, therefore, was not one of the fifty-five counties; however, the contiguous county in which Bryn Mawr is located had a ratio of 257:100. It is interesting that of the 229 students from Montgomery County 150 attended the University of Pennsylvania; 20, Temple; and only 12, Bryn Mawr. If the data

for the University of Pittsburgh had included the entire list of graduate students working in fields in which doctorates were offered, Allegheny County might have had a student-quota ratio greater than 250:100.

In the Far West the four counties in California included one cluster of two counties, Alameda and Santa Clara, in which are located the University of California at Berkeley and Stanford University, respectively. The branch of the University of California at Davis is located in Yolo County, which had a ratio of 259:100. In Oregon, Lane and Benton Counties formed another two-county cluster; the University of Oregon is located in Lane, and Oregon State College is located in Benton.

In the Northwest region there was a two-county cluster in Nebraska centered around the University of Nebraska; the other six counties were more or less widely separated, although Colorado and Kansas had two each. Four of the six counties located in the Southeast region were in Kentucky, and they formed a cluster centered around the University of Kentucky; the remaining two counties were scattered. In the Southwest region there was a two-county cluster in Texas centered around the University of Texas.

Of the twenty-three counties in which none of the included institutions are located but which had ratios above 250:100, eleven helped form the various clusters of counties discussed above, and the other twelve tended to be isolated counties which came under one or more of the following categories: counties in which colleges or universities not included in the study are located, for example, Cache County, the home county of Utah State Agricultural College; counties near two or more of the included institutions, for example, Poweshiek County, Iowa; counties with unusually small populations, for example, Stanley County, South Dakota, and Custer County, Colorado; or counties in which a combination of these and other factors affected the ratio, for example, Dukes County, Massachusetts. In fact, not one of these twelve scattered counties should have had ten students on a basis of their quotas of expected graduate students, and only five of the twelve had quotas above five. Yolo County, California, was one of these five, and the branch of the University of California at Davis is located therein. In contrast, none of the eleven counties which were included in the clusters had quotas below five, and the quota for one of them was 200 students.

The fifty-five counties with ratios above 250:100 had a total quota of 4,728 students but actually produced 16,041 students; yet 3,161 of this quota and 8,719 of these students came from the cluster formed by Westchester County and Greater New York City. When the figures for the cluster centered around the District of Columbia and those for the cluster made up of Alameda and Santa Clara Counties, California, were added to those from the New York cluster, the aggregate quota was 3,624 and the sum of the students was 10,679. When the figures for the cluster in Ohio were added to these, the quota reached 3,739 and the sum of students reached 11,186. From these figures it can be seen that the New York City cluster contained over half the students and nearly three-fourths of the quota for these fifty-five counties and, furthermore, that the four clusters contained approximately seven-tenths of the students and approximately seven-ninths of the aggregate quota for the fifty-five counties. In these four clusters most of the students as well as the greater part of the aggregate quota came from the counties in which the institutions are located. When to these 11,186 students and the quota of 3,739 were added the 601 students and the quota of 198 for Hennepin County, Minnesota, as well as the 501 students and the quota of 167 for King County, Washington, the totals for the six centers reached 12,288 for the students and 4,105 for the quotas.

It is interesting that a number of counties which contain large metropolitan centers but which do not contain any of the eighty-eight institutions had student-quota ratios smaller than 251:100. Wayne County, Michigan, Denver County, Colorado, and San Francisco County, California, are such counties. Likewise, some metropolitan areas which contain one or more of the eighty-eight institutions are located in counties which had ratios smaller than 251:100. Boston, Chicago, Cincinnati, Cleveland, Milwaukee,¹ and St. Louis are such areas.

The fifty-five counties with student-quota ratios above 250:100 tended to have high plane-of-living indices; in fact, it can be seen in Table 46 (see p. 87) that of the fifty-five counties nineteen had plane-of-living indices larger than 129, thirty had indices larger than 99, and forty-six had indices above 69.

¹Although Marquette University is located in Milwaukee, a satisfactory list of students was not available for this institution.

Of the nine counties which had indices below 70, five are located in the Southeast, three are in the Northeast, and one is in the Middle States region. Of more importance is the fact that a majority of the counties which made up the six centers discussed on pages 98 and 99 had indices larger than 100. In only two counties, which accounted for only 108 of the 12,288 students, were the indices less than 100, and in these cases the indices were 77 and 92.

The institutions which are located in these fifty-five counties include both publicly and privately controlled institutions.¹ Many of the large, wealthy institutions are included, and many are not. Of the thirty-seven institutions which are located in the counties with student-quota ratios larger than 250:100, the privately controlled institutions showed a greater tendency toward concentration in more populous areas, and the counties in which they are located tended to have ratios between 251:100 and 500:100. Of the ten privately controlled institutions, nine are in the Northeast region; Stanford University, which is located in Santa Clara County, California (Santa Clara County had a ratio of 634:100), is the only one of these ten located in a county with a student-quota ratio larger than 500:100. Furthermore, the counties in which a number of the large and influential privately controlled universities are located had ratios below 251:100; examples are Harvard University, Johns Hopkins University, the University of Chicago, and Yale University.

Of the twenty-seven publicly controlled institutions which are located in these fifty-five counties, eighteen are institutions located in counties which had ratios larger than 500:100, and four of these are in counties which had ratios above 1,500:100. Of these, only Washtenau County, Michigan, with a population of 11,407, had as many as 10,000 persons in this age group. Two institutions are located in counties which had student-quota ratios between 1,001:100 and 1,500:100; both of these counties had populations of less than 5,000. Twelve of the institutions are located in counties which had student-quota ratios between 501:100 and 1,000:100; of these twelve, three are located in counties with populations less than 5,000, three more are located in counties with populations between 5,001 and 10,000, and six are located in

¹Appendix XX contains a more detailed discussion of the publicly and privately controlled institutions about which the clusters of counties center.

counties with populations greater than 10,000 but less than 20,000.

From the foregoing facts it appears that the publicly controlled institutions tended to be located in areas with relatively small populations; and, as a result, they caused very high student-quota ratios in the counties in which they are located; but the ratios for the neighboring counties tended to drop sharply even though these ratios tended to remain higher than those of more remote counties.

It must be kept in mind that even in the counties with large ratios the population may not have been given unusual opportunity in many fields of study; but thirty of these thirty-seven institutions were included in the fifty-five institutions which were selected because they offered graduate instruction in a variety of fields.

Counties with Student-Quota Ratios Smaller than 51:100

A large portion of the continental United States is included within the boundaries of the counties which had student-quota ratios between 0:100 and 51:100. Table 57 shows that 1,903, or 62.0 per cent, of the 3,067 counties had student-quota ratios smaller than 51:100. The distribution of these counties, as can be seen from the map in Figure 6 (see p. 64), varied markedly from region to region. Since the total number of counties in the various regions range from 150 to 974, a relatively accurate picture may be obtained more quickly from the various regions by looking at the percentages of the counties with ratios smaller than 51:100. While the percentages for the Middle States, Northeast, and Far West ranged from 37.8 to 40.0, the Northwest region had a percentage of 63.9, which was slightly larger than the percentage for the entire nation. But the percentages of 82.4 and 81.4 for the Southeast and Southwest regions, respectively, show that over four-fifths of the counties in these two regions had small student-quota ratios.

An over-all view of the map in Figure 6 shows that most of the Southeast region consists of great expanses of counties which had ratios below 51:100 broken by isolated counties or small clusters of counties with higher ratios. In the Southwest the clusters or lines of counties which had ratios above 50:100 are somewhat larger than in the Southeast, and the clusters in the

TABLE 57

SELECTED INFORMATION CONCERNING THE COUNTIES WITH
STUDENT-QUOTA RATIOS SMALLER THAN 51:100

Region	Counties with Ratios Smaller than 51:100		Students with Homes in Counties with Ratios Smaller than 51:100		Aggregate Quotas of Counties with Ratios Smaller than 51:100	
	Num-ber	Percent-age of All Coun-ties in Region	Num-ber	Percent-age of All Stu-dents with Homes in Region	Aggregate Quota	Percent-age of Ag-gregate Quotas for All Counties in Region
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Northeast....	117	39.7	638	3.2	1,993.3	14.4
Middle States	278	37.8	873	6.4	2,638.7	21.9
Southeast....	803	82.4	1,523	46.7	7,841.5	83.3
Southwest....	306	81.4	684	40.1	2,789.7	78.4
Northwest....	339	63.9	240	11.5	1,118.8	44.1
Far West.....	60	40.0	70	1.8	271.3	9.1
All six re-gions.....	1,903	62.0	4,028	9.1	16,653.4	37.6

Northwest are still larger; in fact, in some parts of a few states in the Northwest the counties which had ratios above 50:100 pre-dominate.¹

The map in Figure 6 and the foregoing explanation giving the locations of areas which had ratios below 51:100 reveal an inverse relationship between the locations of these areas and the locations of institutions included in the study. Even though none of the fifty-five selected institutions are located in a county with a student-quota ratio below 51:100, there are five institutions included in the eighty-eight which were located in such counties. Three are small institutions located in urban centers of the Southeast, another one is a rather small institution located in an urban center of the Southwest region, and no satisfactory list of students could be obtained from the fifth institution, which is located in an urban area of the Northeast region.² Not

¹Appendix XXI contains a detailed discussion of the location of the counties with ratios of less than 51:100.

²Appendix XXII contains a more detailed discussion of

only are there very few of the eighty-eight institutions located in counties which had ratios below 51:100, but also--except for the Southeast region--the counties are, in general, more remote in distance from the fifty-five selected institutions, as shown in the map in Figure 7 (see p. 72).

Although it is important to locate the areas which had very small student-quota ratios, it is even more important to find what portion of the population lived in those areas and thus was affected. It will be recalled that Table 57 shows that 37.6 per cent of the population resided in these areas; if this percentage is translated into quota of expected graduate students, 16,653 of the total quota of 44,326 students resided in these areas. The percentages of the aggregate regional quotas which occurred in the counties with ratios below 51:100 varied greatly from region to region, ranging from 9.1 per cent for the Far West to 83.3 per cent for the Southeast. The quota of 16,653 for these 1,903 counties was composed of 7,842 from the Southeast region--83.3 per cent of that region's aggregate quota; 2,790 from the Southwest--78.4 per cent of its quota; 2,639 from the Middle States--21.9 per cent of its quota; 1,993 from the Northeast region--14.4 per cent of its quota; 1,119 from the Northwest--44.1 per cent of its quota; and only 271 from the Far West--9.1 per cent of its quota.

Table 57 shows--as can be expected--that the percentage of total number of students who attended from counties with ratios less than 51:100 was much smaller than the percentage of the population who resided there; although 37.6 per cent of the aggregate quota and also of the population for all six regions resided in these counties, only 9.1 per cent of the students resided in them. The percentages of students' homes varied by regions from nearly half, namely, 46.7, in the Southeast region and two-fifths, or 40.1, in the Southwest, to one-fiftieth, or 1.8, in the Far West. Of the remaining regions, only the Northwest region with 11.5 per cent had more than 10 per cent of its students from these counties.¹

It appears, consequently, that some of the larger areas contributed a relatively small portion of the quotas and a still

these five institutions.

¹Appendix XXIV gives for selected states the number of students whose homes were located in counties with ratios smaller than 51:100.

smaller portion of the students who were included in this phase of the study. Furthermore, a comparison of Columns 4 and 6 of Table 57 gives the ratios of the students to the quotas for these counties. The ratios were approximately 20:100 in the Southeast and Northwest regions, 25:100 in the Southwest and Far West regions, and 33:100 in the Northeast and Middle States regions.

From Table 46 (see p. 87), which gives a scatter diagram of the distribution of the counties by student-quota ratios and by the plane-of-living indices, it is evident that the counties with ratios below 51:100 tended to have smaller indices. Table 58 gives by regions and by plane-of-living indices the distribution of the counties which had ratios below 51:100. Because the columns are arranged in order of the distribution of the counties among the six classes used in grouping the plane-of-living indices, the order in which the regions are given does not follow the usual pattern.

TABLE 58

REGIONAL DISTRIBUTION OF THE COUNTIES WITH STUDENT-QUOTA
RATIOS SMALLER THAN 51:100 ACCORDING TO THEIR
PLANE-OF-LIVING INDICES

Plane-of-Living Index for the County	Number of Counties with Ratios Smaller than 51:100 in Each Region Having Indicated Plane-of-Living Indices						
	Far West	Middle States	North- west	North- east	South- west	South- east	All Six Regions
0-14.....	..	8	5	6	33	392	444
15-39.....	3	26	36	30	125	341	561
40-69.....	14	79	123	26	113	51	406
70-99.....	27	102	102	39	23	17	310
100-129.....	12	54	69	15	12	2	164
130 and over....	4	9	4	1	...	...	18
Total.....	60	278	339	117	306	803	1,903
Median index for counties with ratios smaller than 51:100...	84.4	77.6	71.6	66.0	39.0	15.7	37.6

Although there were noticeable differences in the distribution of the counties in the Far West, Middle States, Northwest, and Northeast, the differences in the medians of these four regions

were reasonably small. For example, the difference between the medians for the Far West and Middle States was 6.8; the Middle States and Northwest, 6.0; the Northwest and Northeast, 5.6; and the over-all difference--the difference between the median for the Far West and that for the Northeast--was 18.4. In comparison with this there was a difference of 27.0 points between the median of the Northeast and that of the Southwest and a difference of 23.3 points between the median of the Southwest and that of the Southeast. The median index for these 1,903 counties was 37.6, which was not quite equal to the median for the counties with ratios smaller than 51:100 in the Southwest. Of these 1,903 counties, 1,005 had plane-of-living indices smaller than 40; 1,411 had indices of less than 70; and 1,721 had indices smaller than the national average (100).

From the evidence presented in this chapter it may be seen that not only the proximity of graduate institutions but also the socio-economic status of the counties markedly affected their student-quota ratios. Fifty-five counties had ratios larger than 250:100, and these large ratios were considered as evidence that the youth of these counties had unusual opportunities to obtain graduate instruction. A study of these counties indicated that in a majority of them the county contained one of the graduate institutions included in the study or it helped form a cluster of counties around the home county of one or more of the institutions; consequently, the higher ratios tended to be found in the vicinity of the institutions. The highest ratios, however, were not found in counties containing large cities but rather in counties containing relatively small cities and large publicly controlled universities. The number of students from these fifty-five counties far exceeded their aggregate quota. In fact, their aggregate quota was approximately one-tenth of the aggregate quota of the nation; but over one-third of the students had homes located in them.

On the other hand, 1,903--62 per cent of all counties--had student-quota ratios ranging from 0:100 to 50:100, inclusive. These ratios were considered low or meager, and, although over one-third of the aggregate quota of expected graduate students as well as of the population resided in these counties, they actually produced less than one-tenth of the students. There were five of the eighty-eight institutions located in these counties; but the institutions had small enrolments, offered work in a limited number

of fields, and were located in urban centers.

Large areas, especially in the Southeast, Southwest, and the Northwest regions, contained counties with low ratios. In the Southeast region 83.3 per cent of its aggregate quota and 46.7 per cent of its students lived in homes located in these counties, and in the Southwest the percentages were 78.4 and 40.1, respectively. Other regions had certain areas in which there were groups of counties with low ratios, for example, West Virginia in the Northeast and Nevada in the Far West.

On the whole, the 1,903 counties with low student-quota ratios not only were more remote from the fifty-five selected institutions but they also had relatively low plane-of-living indices, small quotas, and relatively few students.

CHAPTER V

SUMMARY AND CONCLUSIONS

Geographical Distribution of Graduate Institutions in the United States

Though the equality of educational opportunity in graduate education is merely a part of the larger problem of equal opportunity at all levels of education, it is a part which has especial significance because many of the potential leaders among the citizens of the United States may be expected to come from the graduate schools; and inequalities of opportunity for graduate training, therefore, must be regarded as a serious weakness in our educational system. Previous studies have considered the actual geographical distribution of institutions--generally undergraduate colleges--and population for certain of the states, and of certain groups of institutions; but it appeared essential to make a study of the geographical distributions of institutions and population for the entire United States because until such a study should be made, no conclusion based on anything more substantial than general impressions--impressions received from incomplete information--could be drawn concerning the extent to which an actual equality of opportunity for graduate study exists. The purposes of the study have been to discover the extent to which recognized graduate schools served the population of the continental United States and to develop techniques which could be applied to the study of similar problems at other levels of education.

Procedures

The course of action followed in developing the study led to the inclusion of graduate work limited wherever possible to work at the doctorate level--work for research doctoral degrees as opposed to professional doctorates; of necessity, however, a few border-line degrees have been included. A list of the fields or departments in which the selected doctorates were granted was compiled for each of the eighty-eight institutions which granted

one or more of these degrees. Complete lists of graduate students with their home addresses¹ were obtained for one regular academic year from as many of these institutions as possible, and a majority of the students were from rosters which listed students for the entire academic year rather than for just one term. Since it was impossible to obtain lists from all the graduate schools for the same academic year, the lists obtained covered a period of five academic years--1933-34 to 1937-38; the lists for the year 1933-34, however, were for only two schools and affected only 126 students. Wherever it was possible to do so, the students included in the study were restricted to those working in departments in which one or more of the selected doctorates were granted, and the major field of interest was found for approximately 70 per cent of the students. In determining the influence of distance upon graduate-school attendance, each county in the United States was located in a series of concentric circles centering around each of the eighty-eight institutions. These concentric circles, or zones, were used in studying the distances which students actually traveled for instruction.

The service rendered to the people of the United States by the selected graduate institutions was studied with respect to those who would receive the instruction rather than with respect to the entire population, most of whom would not be affected directly. The population between the ages of twenty and twenty-nine was considered as including the age range of a majority of the students working for their doctorates; and, in order to facilitate comparisons between the distribution of the graduate students included in the study and the distribution of the population, the quota of expected graduate students was calculated and used. Inasmuch as there were 44,326 students included in the study and 20,703,986 persons aged twenty to twenty-nine in the United States--one student for each 467 persons--the quota for any given area was calculated as one student for every 467 persons aged from twenty to twenty-nine living in that area.

¹The students gave their home addresses at the time they were doing graduate work, and the reliability of these addresses was checked for a large sample of the students. Such addresses, however, do not show the extent to which these students or their families had moved to communities where undergraduate or graduate facilities are available. Since these graduate students may have established legal and bona fide residence in these communities, the addresses are no indication of where the students were born or where they were reared.

In order to obtain a picture of the national patterns of graduate instruction which would include only those schools offering work in a considerable variety of fields, fifty-five institutions were selected from the entire list of eighty-eight, the selection being based upon the number of fields in which work on the doctorate level was offered; no attempt was made, however, to evaluate the work done by the various departments of any one institution or to evaluate the work done in corresponding or similar departments of the various institutions.

Institutional Spheres of Influence

Examination of all the lists of students which were used in the study revealed that the average institution received 44.1 per cent of its student body from homes located in the home county of the institution, 66.9 per cent from homes located within 100 miles, and 78.3 per cent from within 250 miles. Inasmuch as only 0.8 per cent of the population aged twenty to twenty-nine years lived in the home county of this average institution, 4.3 per cent within 100 miles, and 14.3 per cent within 250 miles, it can be seen that the drawing power of the institutions was inversely related to distance. On a basis of these facts and other material presented in chapter 11, the distance which graduate students could be expected to travel for instruction was set at 250 miles.

The median percentages of students with homes within the home county, 100 miles, and 250 miles were somewhat smaller for the list of fifty-five selected institutions than for the eighty-eight institutions, and they were increasingly smaller for Foster's and Embree's lists of the leading or ranking graduate institutions in the United States; yet these figures demonstrate that even the most influential and respected graduate institutions were found to be surprisingly local in their drawing power for students.

A study of the drawing power of a few well known universities revealed the extent to which they drew their students from relatively small areas. For example, 67.1 per cent of the included students studying at Columbia University were from a cluster of adjacent counties made up of Greater New York City and 6 other counties; 33.9 per cent at Harvard University were from 8 counties in central and eastern Massachusetts; 44.5 per cent at Johns Hop-

kins University were from Baltimore city and county, Maryland, and Greater New York City; 64.2 per cent at Stanford University were from 7 counties in California; 59.8 per cent at the University of California were from 6 counties in California; 43.1 per cent at the University of Michigan were from 2 adjacent counties in Michigan; 56.5 per cent at the University of Minnesota were from 2 adjacent counties in Minnesota; 77.6 per cent at the University of Pennsylvania were from 8 adjacent counties in Pennsylvania and New Jersey; 65.9 per cent at Washington University were from St. Louis city and county, Missouri, and St. Clair County, Illinois; and 31.0 per cent at Yale were from 3 adjacent counties in Connecticut.

Although the student-quota ratio for the 3,067 counties in the United States was 100:100, for the 75 counties in each of which at least one of the eighty-eight institutions is located the student-quota ratio was 191:100, and the ratio of students who attended institutions located outside their home counties to the quota was 44:100; for the remaining 2,992 counties in the United States the ratio was 61:100. Furthermore, the average number of students for the 3,067 counties in the United States was 14; for the 2,992 counties having no graduate school, it was 6; and for the 75 counties having a graduate school, it was 337, with 77 of these 337 attending institutions located outside their home counties. While contrasting the number of students produced by the various groups of counties, the reader should note that the average quota of expected graduate students for the 2,992 counties was 10 and for the 75 counties, 176. This evidence indicates that the population of the home counties of these eighty-eight institutions not only produced large numbers of students who attended the home institutions but they also produced many students who attended institutions located outside the students' home counties.

Regional Patterns¹

The serious lack of actual equality of opportunity for education on the graduate level is revealed even more strikingly by a study of regional patterns. These regional distributions indicated that the percentages of the students' homes located in the Northeast, Middle States, and Far West regions were larger than

¹The six major regions and the states of which each region is composed are listed on pp. 9-10.

the percentages of the population located there; and the institutions located in the Northeast and Middle States drew still more students from other regions. As a result, the Southeast, Southwest, and Northwest regions, with nearly 35 per cent of the population, contained the homes of only approximately 15 per cent of the students, yet less than 10 per cent of the 44,326 students attended the institutions located in the three regions.

That the institutions of the Northeast, Middle States, and Far West regions more adequately served the population of their respective regions than did the institutions located in the Southeast, Southwest, and Northwest regions was apparent. Inasmuch as the first three regions had more of the well known and larger centers of graduate instruction, larger percentages of the population, larger percentages of that population using facilities for graduate study, and larger percentages of students attending schools located within the regions in which the students' homes were located, it appeared that a large percentage of the students attending graduate schools preferred to attend near-by institutions giving the types and quality of instruction desired rather than to travel to other sections or regions of the country for similar instruction.

In each region more than 80 per cent of the students were attending institutions located in their home regions. Although only 7.1 per cent of the students enrolled in institutions located in the Southwest were from other regions, the percentages of students with homes outside the respective regions ranged from 15.3 to 18.0 per cent for the other five areas.

The Northeast region produced three students for every two expected according to its quota, and the Far West produced four for every three expected. At the other extreme, the Southwest produced only one student for every two expected; and the Southeast, only one for every three expected. Over three-fourths of all the students had homes located in the Northeast and Middle States regions; in contrast, approximately only one-ninth had their homes located in the Southeast and Southwest regions. The enrolment figures for the various regions were even more extraordinary in that nearly one-half of the students were enrolled in institutions located in the Northeast region; approximately another one-third attended institutions located in the Middle States; but less than one-tenth were matriculated in institutions located in the South-

east, Southwest, and Northwest regions combined.

A map of the national distribution of students shows that the students' homes tended to be located in the band of states from Massachusetts southward to Maryland, then westward along the Great Lakes through Illinois with fringes extending through northern Missouri to eastern Kansas and Nebraska and also into large parts of Iowa, Wisconsin, and Minnesota. Central Oklahoma and central Texas formed an island of counties which contained relatively large numbers of students' homes; possibly these counties could be considered an extension of the fringe from the larger section. A second large concentration of students was found along the Pacific Coast area of the Far West region. In contrast with these concentrations, relatively few students had homes located in the Southeast, Southwest, and Northwest regions; there were also only a few students who had homes located in counties on the periphery of the other three regions.

The material used in this study reveals that within the nation there are many communities which produced very few--if any--individuals who took advantage of the opportunity for graduate instruction. Of the 3,067 counties in the United States, 819 furnished no students at all, and another 538 supplied only one student per county. The Southeast, Southwest, and Northwest regions accounted for 698 of the 819 and 404 of the 538 counties. On the basis of their aggregate quotas of expected graduate students, these 1,102 counties which are located in the three regions should have accounted for nearly 5,000 students. It will be recalled that while these three regions should have produced approximately 15,500 students, actually they produced very slightly more than 7,000, or less than half their aggregate quotas.

In general, the density of the student population (found by determining the number of students per thousand square miles for each county) was greater in the Northeast and Middle States regions, as well as in small areas along the Pacific Coast. Sixty-one counties, which had over 200 students per thousand square miles, produced 26,884 students, although their aggregate quota was 14,122. Of these 26,884 students, 23,452 were from counties in the Northeast and Middle States regions.

Of an aggregate quota of 3,759, the 973 counties which had less than one student per thousand square miles actually produced 223 students. Over 800 of these counties were located in the

Southeast, Southwest, and Northwest regions. It is significant that counties with relatively small densities of student population tended to have small student-quota ratios.

Even though the population of the United States was not evenly distributed in all parts of the country, the population was more evenly distributed than were the students. None the less, the large centers of population tended to be grouped in a relatively few counties; there were eighteen counties which, on a basis of their aggregate quota, should have had a total of 11,252, or over one-fourth, of the students; but they actually had 18,370, or over two-fifths of all the students. For the entire nation there was a trend for the student-quota ratio to increase as the population of the counties increased.

The quota of expected graduate students per thousand square miles was determined for each county and used in studying the density of the population. This density was greater in the eastern part of the United States, which includes the Northeast, Middle States, and Southeast regions. Of the 60 counties which had quotas of 201 or more expected graduate students per thousand square miles, none were located in the Southwest region, and the Northwest and Far West regions each had only three such counties. These three regions also contained 356 of the 375 counties with quotas of less than 2 students per thousand square miles. As the density of the population increased, the student-quota ratio likewise increased, although the influence of various large publicly controlled institutions which are located in relatively sparsely populated counties could be seen.

A classification of the counties by their student-quota ratios showed that the counties which had the smaller ratios tended to be located in areas which were less populous, more remote from graduate institutions, and poorer on the socio-economic scale as shown by their plane-of-living indices. As stated above, there were 819 counties which had ratios of 0:100, while 1,903, or 62.0 per cent of the 3,067, had ratios of 50:100 or less, and only half or fewer than half as many students as they should have had according to their population. The aggregate quota of these 1,903 counties shows that 16,653 students should have come from homes located within them, but only 4,028 students actually came from such homes. In sharp contrast were 56 counties which had ratios larger than 250:100 and quotas totaling 4,734 but actually produced

16,056 students from homes located within their boundaries.

An index of graduate-school availability was used to measure the accessibility of graduate instruction to the population of the various counties. Since only the fifty-five selected institutions were used in calculating this index, the index for a given county was the sum of the fifty-five individual institutional indices of availability to that county. The institutional indices were determined for each zone by calculating the number of students attending the fifty-five institutions whose homes were located in that zone per 100,000 of the fifty-five sums of the population residing there.

When the counties were grouped by their indices of graduate-school availability, the sum of the quotas of expected graduate students for the forty-seven counties in which these fifty-five selected institutions are located was 11,026; yet these forty-seven counties produced 23,419 students, over twice as many in proportion to their population as the average for the country. The quotas for the seventy-three counties with indices equivalent to having one institution located in the county totaled 13,162; of these, 8,361 lived in the Northeast region; 3,266, in the Middle States; 1,239, in the Far West; but only 217, in the Southeast; 57, in the Northwest; and 31, in the Southwest. Actually, 26,066 students lived in these seventy-three counties; of these, 15,645 lived in the Northeast; 7,185, in the Middle States; 2,132, in the far West; and approximately 1,000, in the other three regions combined.

At the other extreme, a high percentage of the 460 counties which had indices equivalent to no institution within 250 miles are located in the Northwest with 179 such counties, the Southeast with 128, and the Southwest with 120. The aggregate quota for these 460 counties was 2,521 but actually only 938 students came from homes located in them. The 1,260 counties which had indices equivalent to no institution within 100 miles actually produced only 3,607 students, of whom 1,273 were from the Southwest, 822 from the Southeast, and 804 from the Northwest region. These 1,206 counties had an aggregate quota of 9,304 students, of whom 3,904 should have been from the Southeast region, 3,072 from the Southwest, and 1,465 from the Northwest. Even though the student-quota ratio tended to vary inversely with the distance, comparatively large proportions of the students from the Southeast, South-

west, and Northwest regions came from counties which are relatively remote from the selected institutions.

The socio-economic pattern formed by the plane-of-living indices of the counties tended to follow not only the pattern of the student-quota ratios but also that of the distribution of the students' homes since the large indices were concentrated in the Northeast, Middle States, and Far West regions. Low indices were very numerous in the Southeast and Southwest regions, but there were more relatively large plane-of-living indices in the Northwest region.

In the Southeast and Southwest regions a large percentage of the students came from counties with low socio-economic indices, whereas in the other regions the tendency was for relatively fewer students to come from counties with low indices and more from counties with larger indices. For the entire nation the student-quota ratios tended, on the whole, to be smaller for the poor counties and larger for the wealthy counties.

Inequality of Opportunity

In the United States, democratic leaders have recognized that each individual should have an equal opportunity to receive as much education as he can use, but the preceding data reveal the significant fact that the population of the various counties had inequitable opportunities to attend these graduate institutions, and the marked variations in the geographic location or position of the counties contributed to the inequalities.

Although many factors affected the inequality of opportunity, an attempt was made to discover the relative value of three important ones--distance or geographical location as measured by indices of graduate-school availability, socio-economic status as measured by plane-of-living indices, and density of population as measured by the quotas of expected graduate students per thousand square miles. Of the three factors, the density of population appeared to have the least influence whereas the other two were more nearly equal; the socio-economic status, however, appeared to have had somewhat more influence than did proximity to graduate schools except for the counties which are located in the immediate vicinity of one or more graduate institutions.

When the counties were classified on the basis of their student-quota ratios--the extent to which the population use the

available graduate facilities--there were fifty-five counties with student-quota ratios above 250:100 which are scattered throughout twenty-six states, but thirty of these counties are located in the Middle States and Northeast regions. The counties occur singly or in small clusters of two and, in a few cases, of three or four. Thirty-four of them are the home counties of one or more of the eighty-eight institutions included in this study. Of the remaining counties, eleven are contiguous with counties in which at least one of the eighty-eight institutions is located, and the other twelve are scattered counties in which an institution of higher learning which is not included in this study is located or in which relatively few people lived. Although the student-quota ratios of these counties were higher than the ratios of the neighboring counties, the ratios of the near-by counties were in turn higher than the ratios for the more remote counties. The extremely large student-quota ratios tended to be those for the counties with relatively small populations in which large, publicly controlled institutions are located.

The fifty-five counties had, in general, favorable socio-economic indices; over one-third had indices of 130 or larger, and over one-half had indices of 100 or larger. The fifty-five had an aggregate quota of 4,728 students, but actually 16,041 students came from them; over half of these students and much more than half of this quota came from the New York City cluster of counties.

The publicly controlled institutions located in the fifty-five counties tend to be in sparsely populated counties, whereas the privately controlled institutions are principally in metropolitan areas. It should be recalled that a number of the large, influential institutions are not located in these counties--four such institutions being Harvard University, Johns Hopkins University, University of Chicago, and Yale University.

A large portion of the area of the United States is included in the 1,903 counties which had student-quota ratios smaller than 51:100; in fact, over 80 per cent of the counties in the Southwest and Southeast regions and over 60 per cent of the counties in the Northwest region had ratios below 51:100. Comparatively large areas of counties with small ratios were also found in certain sections of the Northeast, Middle States, and Far West regions.

Although none of the fifty-five selected institutions are

located in counties which had student-quota ratios less than 51:100, there are five of the eighty-eight institutions located in such counties. Three of these are very small institutions which offered work in a limited number of fields; the fourth, while somewhat larger, is nevertheless a small institution, and the fifth is one from which no satisfactory list of students could be obtained.

While approximately three-eighths of the population of the United States lived in counties with ratios below 51:100, only one-eleventh of the students had homes located therein, even though over two-fifths of the students whose homes were in the Southeast and Southwest regions came from counties which had ratios of less than 51:100. These 1,903 counties tended to have low socio-economic ratios, for over half of them had plane-of-living indices of less than 40, and less than 200 of them had indices of 100 or larger. It will be recalled that an index of 100 was the index for the entire nation.

Conclusions

The data have evinced that every graduate institution included in the study--even the large, influential ones--obtained a large percentage of its students from a relatively small area propinquent to the university. Large percentages of the graduate students evidently preferred to attend near-by institutions which gave the type and quality of instruction desired. This fact may be noted by observing that the Northeast, Middle States, and Far West regions, which had more of the large, influential graduate institutions and larger percentages of the population, had larger percentages of their population using the facilities for graduate study and also larger percentages of local students attending local schools. In the case of the Northeast and Middle States regions, these institutions gained in the regional exchange, which may indicate that some students are willing and able to travel to attend the institution of their choice, whereas many others continued their studies only when they were able to attend an institution not too far removed geographically.

The conclusion can be drawn that the population of those areas in the United States which are lower on the socio-economic scale and which are less populous tend to have fewer near-by grad-

uate institutions and that the youth in this population have less opportunity to continue their training on the graduate level. Since opportunity for graduate instruction should be equally available to our future leaders, the inequality in opportunity for an education at this level provides a serious handicap for the youth of extensive areas in the United States; and the youth of such areas comprise a large percentage of the population. Furthermore, this inequity of opportunity is undemocratic in that it is based upon such factors as the geographical location of their homes as well as the socio-economic status of the area in which they live. The lack of collective or co-operative planning in locating the present graduate institutions has created a serious handicap for the prospective leaders of the United States.

The solution lies in so educating those large numbers of the American people who have relatively little opportunity to attend graduate schools that they become more conscious of the value of advanced study and in providing some method of reducing the handicaps, particularly those due to the geographical location of the individual's home and to the socio-economic status of the area in which he resides. One solution may be to build more institutions in the less populous areas, although the data on the publicly controlled institutions which are located in relatively sparsely populated counties indicated that the sphere of influence was not too extensive and that many such institutions would be required. Another solution may be to grant some form of financial aid, such as substantial scholarships awarded on a basis of merit and distributed geographically on a basis of population with especial attention to the population of those areas which do not provide their proportionate share of graduate students.

Problems Which Merit Further Study

A number of related problems which merit additional study have arisen. Without attempting to rank them according to their importance, a few of these problems are noted.

1. Is it possible to develop a valid and reliable method of determining the quality of graduate instruction in the various fields and institutions?

2. Is it desirable to standardize the forms used by institutions of higher learning in reporting information--informa-

tion as to courses offered, requirements for degrees, students enrolled, and successful candidates for degrees? If so, how can the standardization be accomplished most effectively?

3. What is the distribution throughout the United States of the facilities for graduate work in the various fields or broader areas of learning?

4. How can existing institutions co-operatively extend their spheres of influence in order to reduce the present inequalities in opportunity?

5. To what extent is the concentration of student population in university centers affected by the practice of students (or their families) deliberately moving to a community where university opportunities are available? In other words, to what extent may students legitimately claim the university cities as their residences even though they were born and reared elsewhere and though they may intend to move to other locations when they have completed their studies?

6. Should the people of the United States establish more graduate institutions, or should the nation's expenditures be used in the future to improve and enlarge the existing institutions? If new institutions should be established, should they be built in densely or sparsely populated areas, and in which particular areas?

7. What will be the best method or methods of reducing or erasing the existing inequalities in opportunity extended American youth to study in graduate schools? What agency of society should be responsible for eliminating inequalities? Are any parts of the American population being given inadequate opportunity? Is it possible to provide undue opportunity for graduate study through duplication of facilities within a given area? If so, at what point does opportunity become undue opportunity?

APPENDIXES

APPENDIX I. INSTITUTIONS INCLUDED IN THE STUDY

TABLE 59

Institution Code Number	31 A.A.U. Members	55 Selected Institutions	Name and Address of Institution
(1)	(2)	(3)	(4)
1			American University, Washington, D.C.
2		x	Boston University, Boston, Mass.
3	x	x	Brown University, Providence, R.I.
4		x	Bryn Mawr College, Bryn Mawr, Pa.
5	x	x	California Institute of Technology, Pasadena, Calif.
6			Carnegie Institute of Technology, Pittsburgh, Pa.
7	x	x	Catholic University of America, Washington, D.C.
8	x		Clark University, Worcester, Mass.
9			Colorado School of Mines, Golden, Colo.
10			Colorado State College of Education, Greeley, Colo.
11	x	x	Columbia University, New York, N.Y.
12	x	x	Cornell University, Ithaca, N.Y.
13			Drew University, Madison, N.J.
14			Dropsie College, Philadelphia, Pa.
15	x	x	Duke University, Durham, N.C.
16			Duquesne University, Pittsburgh, Pa.
17		x	Fordham University, Fordham, New York, N.Y.
18			George Peabody College for Teachers, Nashville, Tenn.
19			Georgetown University, Washington, D.C.
20		x	George Washington University, Washington, D.C.
21			Hartford Seminary Foundation, Hartford, Conn.
22	x	x	Harvard University, Cambridge, Mass.
23	x	x	Indiana University, Bloomington, Ind.
24		x	Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa
25	x	x	Johns Hopkins University, Baltimore, Md.
26			Kansas State College of Agriculture and Applied Sci- ence, Manhattan, Kan.
27			Lawrence College, Appleton, Wis.
28		x	Louisiana State University and Agricultural and Me- chanical College, University, La.
29			Loyola University, Chicago, Ill.
30			Marquette University, Milwaukee, Wis.
31	x	x	Massachusetts Institute of Technology, Cambridge, Mass.
32			Massachusetts State College, Amherst, Mass.
33		x	Michigan State College of Agriculture and Applied Science, East Lansing, Mich.
34		x	New York University, New York, N.Y.
35			Niagara University, Niagara Falls, N.Y.

TABLE 59--Continued

(1)	(2)	(3)	(4)
36	x	x	Northwestern University, Evanston, Ill.
37	x	x	Ohio State University, Columbus, Ohio
38		x	Oregon State College, Corvallis, Ore.
39		x	Pennsylvania State College, State College, Pa.
40			Polytechnic Institute of Brooklyn, Brooklyn, N.Y.
41	x	x	Princeton University, Princeton, N.J.
42		x	Purdue University, Lafayette, Ind.
43		x	Rensselaer Polytechnic Institute, Troy, N.Y.
44		x	Radcliffe College, Cambridge, Mass.
45			Rice Institute, Houston, Tex.
46		x	Rutgers University, New Brunswick, N.J.
47		x	St. Louis University, St. Louis, Mo.
48			Southern Baptist Theological Seminary, Louisville, Ky.
49	x	x	Stanford University, Palo Alto, Calif.
50			State College of Washington, Pullman, Wash.
51	x	x	State University of Iowa, Iowa City, Iowa
52			Syracuse University, Syracuse, N.Y.
52a			New York State College of Forestry, Syracuse, N.Y.
53			Temple University, Philadelphia, Pa.
54			Tulane University of Louisiana, New Orleans, La.
55			University of Arizona, Tucson, Ariz.
56			University of Buffalo, Buffalo, N.Y.
57	x	x	University of California, Berkeley, Calif.
58	x	x	University of Chicago, Chicago, Ill.
59		x	University of Cincinnati, Cincinnati, Ohio
60		x	University of Colorado, Boulder, Colo.
61			University of Florida, Gainesville, Fla.
62	x	x	University of Illinois, Urbana, Ill.
63	x	x	University of Kansas, Lawrence, Kan.
64			University of Kentucky, Lexington, Ky.
65		x	University of Maryland, College Park, Md.
66	x	x	University of Michigan, Ann Arbor, Mich.
67	x	x	University of Minnesota, Minneapolis, Minn.
68	x	x	University of Missouri, Columbia, Mo.
69	x	x	University of Nebraska, Lincoln, Nebr.
70	x	x	University of North Carolina, Chapel Hill, N.C.
71			University of North Dakota, Grand Forks, N.D.
72			University of Notre Dame du Lac, Notre Dame, Ind.
73			University of Oklahoma, Norman, Okla.
74		x	University of Oregon, Eugene, Ore.
75	x	x	University of Pennsylvania, Philadelphia, Pa.
76		x	University of Pittsburgh, Pittsburgh, Pa.
77		x	University of Rochester, Rochester, N.Y.
78		x	University of Southern California, Los Angeles, Calif.
79			University of Tennessee, Memphis, Tenn.
80	x	x	University of Texas, Austin, Tex.
81	x	x	University of Virginia, Charlottesville, Va.
82		x	University of Washington, Seattle, Wash.
83	x	x	University of Wisconsin, Madison, Wis.
84		x	Vanderbilt University, Nashville, Tenn.
85	x	x	Washington University, St. Louis, Mo.
86		x	Western Reserve University, Cleveland, Ohio
87			West Virginia University, Morgantown, W.Va.
88	x	x	Yale University, New Haven, Conn.

